The Mining Journal

London, April 12, 1957

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Vol. 248 **No. 6347**

Established 1835

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Published each Friday by

THE MINING JOURNAL LTD.

Directors

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15, WILSON STREET, LONDON, E.C.2.

Telegraphic Tutwork London
Telephone MONarch 2567 (3 lines)

Annual Subscription £2 10s. Single copy ninepence

Overseas Trading Corporations

WHATEVER hopes and fears were realized or dashed by Mr. Peter Thorneycroft's first Budget, the British overseas mining industry ought to be well pleased the Chancellor implemented the undertaking (inherited from the previous Chancellor) to give relief to " overseas trading corporations ".

It will be recalled that the Royal Commission under Lord Radcliffe's chairmanship put forward the novel idea that U.K.-controlled companies operating overseas be designated as Overseas Trade Corporations and, as such, be entitled to special tax treatment. This important group of companies have always been subject to tax at the very high U.K. rate which, in countries where the tax rates are lower than in the U.K., placed them at a definite disadvantage compared with local competitors. Criticism of this arrangement had been made for many years and it was the major factor prompting U.K.-controlled companies to emigrate to the actual seat of their operations. Successful applications to emigrate, lost to this country not only appreciable tax revenue but, more important, control over the mineral resources. The solution to this problem lay in effecting descriminatory leglislation in favour of such companies which, in itself, wedded as this country has been for many years, to a stultifying egalitarian tax code, required a good deal of courage.

What the Chancellor actually said is worth repeating. " Concerns that qualify as Overseas Trade Corporations will be exempted from income tax and profits tax on their trading profits earned abroad.

" Of course, when they pay dividends or other distributions to shareholders out of those trading profits, those dividends will be liable to U.K. income tax and if they are received by a U.K. company to profits tax also. In appropriate cases there would, of course, be relief for taxes paid abroad ".

Legislation of this kind involving a major reform must inevitably be long and complicated, and until the Finance Bill is published, it is impossible to be precise. However, as the Chancellor said that he proposes " in substance " to adopt the Royal Commission's recommendations, it can be stated that companies qualifying as Overseas Trade Corporations must be controlled and managed in the United Kingdom, and secondly, that any company qualifying as an O.T.C. can benefit only to the extent of the difference between local and U.K. tax rates except where the company is not already receiving the benefit of double taxation relief.

Companies covered by the Chancellor's proposals include those wholly engaged overseas in mining, oil-winning, agriculture, manufacture and processing, public utilities and distribution.

In any event it is fairly clear that the benefits deriving are long-term rather than short-term considerations. Yet, even at this early stage it can be said that the proposed legislation should put an end to companies applying for exit visas, in all but the most unusual cases; mining companies will be able to strengthen their financial position as well as giving a more reasonable return

on capital invested; and finally, that the market for U.K. mining and machinery manufacturers should be widened considerably.

It would be less than justice to end this note without mentioning the long and untiring campaign waged by the British Overseas Mining Association for more equitable tax codes applicable to the British overseas mining industry. And the Association is to be warmly congratulated for its efforts in this direction. There are, nevertheless, more concessions to be wrung from the government before the British overseas mining industry is operating under as favourable conditions as companies controlled elsewhere. But a start has been made on reducing the disadvantages and this gives every hope that other inequitable tax arrangements will also disappear.

HAVE WE ENOUGH WATER ?

There is a growing realization that the resources of the world are not inexhaustible. Water and soil are already limiting factors in industrial and agricultural production, as Sir Harold Hartley pointed out last year when summing up a series of lectures on the conservation of natural resources, organized by the Institution of Civil Engineers. The subject is one with which the mining and metal industries, as very large users of both commodities, are very closely concerned.

In 1952, the Paley Commission reported that in the United States there already existed a serious industrial water problem. The Commission stated that by 1975 American industry would require 2½ times as much water —an estimate roughly in agreement with that for England and Wales—and that by then access to good water might be the most important factor in determining the location of industry.

To produce one ton of steel in America, 65,000 gals. of water are required. In 1950 the steel industry used 16 per cent of U.S. industrial water and petroleum refining a further 9 per cent. Electricity generation requires large quantities of water for cooling purposes, present-day oil or coal-fired power stations using between 40 and 50 gals. per kilowatt produced. The first atomic power stations constructed will require quantities in excess of these figures, but it is expected that as techniques develop the water requirements for future atomic stations will come to compare more closely with those of conventional power stations.

These facts are cited by the Welsh Economic Development Council in a memorandum entitled " Water Resources and the Welsh Economy ", in which critical consideration is given to the decision of Liverpool Corporation to seek Parliamentary permission to augment its water supply by flooding the Tryweryn Valley, Merioneth. This scheme has met with heavy opposition in Wales.

The memorandum emphasizes that responsible bodies in Wales have long-term plans for coal, gas, electricity and afforestation. Water is the public utility upon which these industries and the entire Welsh economy depends, but there is no central research and development body and no plan for water. It is pointed out that water is as much a natural resource as coal, lead, slate, granite or petroleum, but since it moves under the influence of gravity its proper use and conservation require co-operation between all parts of each river basin.

British Columbia, it is stated, derives substantial revenue from the exploitation of its water resources, and its method of controlling and administering the use of surface water is of particular interest. The Welsh Economic Development Council welcomes the decision of the responsible Minister to have a survey made of the water resources of Wales and to appoint a committee to advise him on matters relating to the conservation and utilization of water.

Among the lecturers in the series to which reference was previously made was the Nottingham City Engineer and Surveyor, Mr. R. M. Finch, who asked for national legislation to ensure that every local authority or developer of any kind replaced every acre taken from agriculture by bringing into use derelict land. Mr. Finch said that, although it would add 5s. 6d. a ton to the price of coal to pack all the dirt from collieries back underground, much could be done to avoid adding to the 20,000 acres of land occupied by colliery waste. For instance, in Nottingham, where a project is envisaged for the construction of a trunk road requiring an embankment, material has been diverted from a nearby colliery which will effect a saving of £100,000 in the eventual cost of the road.

It is evident that water conservation and soil reclamation present problems which will increase in magnitude and urgency with growth of population and industry. The solution of these problems and the measures adopted by local authorities and other interested bodies, will have an important bearing on mining expansion, especially in the more heavily populated and highly industrial countries.

CEYLON'S MINERAL POTENTIAL

The possibilities of exploiting the mineral resources of Ceylon, with a view to solving the unemployment problem by industrializing the country, were discussed immediately after the formation of a Geographical Society at the University of Ceylon. Dr. K. Kularatnam, of the Geographical Department, presided at the meeting, and said that one course would be to tap the mineral resources of the country.

Dr. Kularatnam pointed out that graphite constituted the most important mineral deposit in Ceylon. Yet, despite the country's almost inexhaustible supplies, exports had declined, not because of decrease in demand or because other countries were producing better graphite, but owing to the fact that Ceylon graphite had been mixed with other materials.

It was also possible for Ceylon to exploit iron ore. Surveys showed that approximately 6,000,000 tons of high-grade ore existed in the country. Imports were about 30,000 tons. Yet Ceylon could claim 3,000,000 tons of iron ore, enough for 100 years of exploitation.

Other minerals that could be exploited were ilmenite, of which about 5,000,000 tons were sited along the sea coast, monazite and mica.

RUSSO-YUGOSLAV MINING ENTERPRISES

Events in 1956 eclipsed the most optimistic Yugoslav expectations as to the strengthening of economic relations with the Iron Curtain countries. During the period, trade agreements were concluded with the Soviet Union, Poland, Hungary, Rumania and Bulgaria. Mining equipment and mined or processed metal products constituted an impressive proportion of the commodities interchanged. The most important agreements were those concluded with Soviet Russia.

In January, 1956, an investment agreement was signed between Yugoslavia and the Soviet Union involving the

construction of nitrate, superphosphate and thermal electric plants and the reconstruction of three coal mines in Yugoslavia, the amount of credit being estimated at approximately U.S.$70,000,000. At the beginning of August a supplementary agreement worth U.S.$40,000,000 was concluded between the same signatories, covering the opening of a new lignite mine of 2,500,000 tons annual capacity at Kosovo, together with ancillary equipment designed for the exploitation of crude oil and natural gas at the site, Repayment of both these loans is to be accomplished within 10 years at 2 per cent interest.

In the same month a similar type of agreement was concluded jointly with the Soviet Union and Eastern Germany, covering the construction of an aluminium plant in Yugoslavia with a 50,000 tons annual capacity as well as the establishment of related hydro-electric plant, the extension of existing bauxite mines and the opening of a new coal mine. Under this agreement, the Russians and Germans will grant credit of U.S.$175,000,000 at 2 per cent over 20 years. Payment is to be made in aluminium ingot and rolled products.

PORTUGUESE MINERAL EXPORTS IN 1956

Statistics recently published, relating to Portugal's exports of tungsten ores during 1956, show that a total of 4,374 tonnes was exported, including some 500 tonnes of WO_3-bearing residues. This production was valued at Esc.290,046,000 as against the Esc.285,556,081 earned in 1955 by the exportation of 4,476 tonnes. The fall in prices towards the end of the year caused many exporters to sell at what constituted—at that date—a much reduced price, thereby accounting for the lower value of the output. The tendency after June was to concentrate more on cassiterite than on tungsten, the outlook for the former being certain whereas that for the latter grew progressively more difficult.

The following metric tonnages of tungtsen exported from Portugal in 1956 were absorbed by at least eight countries, namely the United Kingdom 2,001, the United States 1,165, Germany 744, France 127, Holland 123, Austria 85, Japan 84, and Sweden 29. Other consumers bought 16 tonnes.

With Spain buying all available cassiterite and with domestic demand on the increase, it is scarcely surprising that only 118 tonnes were exported from Portugal in 1956. The 323 tonnes dispatched in 1955 was already far below the normal annual average. These remarks require some explanation; for while Spain is a foreign country to the Portuguese exporter, it is nonetheless true that the confiscation of parcels of both tin ore and metal seems to be frequent in Spain due to the absence of legal transport certificates. It is equally obvious that extreme doubt exists as to whether any record is kept of such transactions, and in consequence none can appear on the relative official documents.

When plans materialize for the erection of a large plant to smelt the locally won ore, it is considered possible that the export of cassiterite will be forbidden, as the metal will be required for the proposed new tinplate industry. That the local smelters can produce high-grade tin metal is shown by the exports of that material to countries where a high standard of purity is required. In 1956 total exports were 220 tonnes as against 157 in 1955.

Brazil took 79 tonnes and the U.K. 39 tonnes of cassiterite in 1956. The metric tonnage of tin metal exported durng the year went to the United States 72, Angola 30, Brazil 27, France 20, Mocambique 19, Hungary 12, and Canada and the U.K. each 10. Other countries 20 tonnes.

The continuing demand for iron ore is revealed by the 187,462 tonnes of haematite worth Esc.30,054,028 and the 72,602 tonnes of magnetite valued at Esc. 20,639,222 exported during 1956. The comparable figures for the previous year were 115,835 tonnes of haematite and 36,880 tonnes of magnetite. During the year, the ports of destination for iron ores are listed as Emden, Port Talbot, Bremen and Rotterdam.

The Portuguese have great expectations regarding the future of their iron ore deposits when the erection of the new foundries is completed and operations commence. It is fully realized, however, that the scheme contains more "imponderables" than "certainties", and that technical knowledge will constitute a very important factor of success. It is reported that one British, one French and one German company are competing for the contract.

An estimated 325 tonnes of ferro-tungsten was exported in 1956 against 224 tonnes in 1955. In view of the increasingly strict specification required by consumers regarding detrimental impurities in tungsten-bearing materials, at least three new companies are to commence the manufacture of ferro-tungsten this year. Exports in 1956 went to the United States, Sweden, Germany, Belgium and Italy.

During the year 408,574 tonnes of cupreous pyrites was exported as against 451,355 in 1955. Exports of burnt pyrites totalled 188,501 tonnes. There have been no exports of this commodity in 1955.

Ilmenite, china clay and tungstic acid are newcomers to the Portuguese minerals export scene. Some 575 tonnes of ilmenite, 1,000 tonnes of china clay and 905 kilos of tungstic acid were sent abroad in 1956. The respective destinations were London, Belgium, and Germany. The majority of Portugal's beryllium output was sold to Philadelphia.

HUNGARIANS IN THE BALANCE

The National Coal Board's conditional offer to remove penalties attached to weekly bonus payments to miners has received a very unfavourable reception in the coal fields. As was to be expected, Yorkshire miners were the first to overwhelmingly reject the Board's concession and protested strongly against the condition of the offer that foreign workers be absorbed into Yorkshire pits. The Board is now in the embarrassing position of having 2,000 Hungarian refugee miners under training in various centres throughout Britain with only 500 places so far having been found for them—chiefly in S. Wales. Unless the individual lodges show considerably more enthusiasm than recent returns suggest, it looks as though the Board is going to have to extend indefinitely the basic English instruction courses now nearing scheduled completion.

Unfortunately, it is from the areas where the labour shortage is most acute that the strongest objection to foreign labour comes. It is, of course, recognized that the prevailing labour shortage is a very cogent bargaining tool but even if humanitarian feelings are absent, is it too much to hope that these dissentious miners who so blithely disregard the recommendations of their leaders can be educated to appreciate that Britain's prosperity—and hence their own—depends on every ton of coal that can be mined? From the national standpoint it is immaterial of what race or colour is the man at the end of the shovel.

Now is the time for both sides to have a re-appraisal of the whole issue. As a gesture of faith let the N.C.B. remove the conditions attached to their offer and in turn let the lodges think again and adopt a commonsense policy.

SINCE 1948, when a little over two tons of titanium metal were produced, output of titanium sponge in the United States has risen to approximately 14,100 tons in 1956. This tonnage is expected to increase by 50 per cent during 1957, while production of sponge at about 30,000 tons is envisaged in the years 1960-1965.

During 1956 some 10,900 tons of sponge were melted with 2,000 tons of scrap to make 11,600 tons of titanium ingots. Approximately 10,700 tons of ingot were used to produce 5,100 tons of mill products. This output of mill products represents an increase of 170 per cent over the 1955 production of 1,898 tons. By 1958, the demand for mill products is expected to reach three times that of 1956. Upwards of 90 per cent or more of these requirements will probably be in military applications.

The Future

The development of suitable titanium castings should lead to substantial new markets in American industry. The metal is expected to find considerable application in nuclear reactors and reprocessing systems.

One of the big problems associated with the future price and therefore demand for titanium is concerned with scrap. It has been estimated that the present ratio of sponge to saleable product is 1.5 to 1 and it has been predicted that this can be reduced to 1.2 to 1 within the next five to ten years. On the other hand, scrap generated by the ultimate user has been estimated to be about 50 per cent compared with 10 per cent for aluminium in similar applications.

While a substantial percentage of the pure scrap can be remelted with sponge satisfactorily, the use of alloy scrap is going to be limited until efficient methods of refining are developed. The building of a pilot plant for the refining of scrap into pure metal by an electrolytic process has been announced, but until more information has been obtained the relative economics are still undetermined.

In summary, it is believed that the production of titanium sponge should reach about 22,500 tons this year, having a value in excess of $100,000,000. By 1960-1965, the demand for sponge may lie between 30,000 and 35,000 tons, being worth approximately $140,000,000. Should these levels be reached, resale value of scrap in the hands of the ultimate producer of finished parts should be in the order of $15,000,000 to $20,000,000 (5,000 tons of contained titanium) assuming that fabricating improvements can halve present scrap losses.

Zirconium, like titanium, has been a post-war growth metal, although the growth in this case is principally a result of nuclear energy demands. Production of hafnium-free zirconium has grown from a few thousand pounds in 1949 to approximately 460,000 lb. in 1956. The expansion of production facilities to an estimated 2,000 tons, i.e. 4,000,000 lb. is scheduled for 1959. Of this amount, the A.E.C. has contracted for the delivery of approximately 12,000,000 lb. over the next five years, or roughly three-fourths of the estimated total productive capacity over the same time period.

On the assumption that supplies presently contracted for by the A.E.C. are to supply projects already under way, marked increases in currently planned zirconium capacity may be expected during the next five years. The Carborundum Metals Co. has recently stated that it is selling reactor grade sponge on the open market at $9.50 per lb. and expects to have 350,000 lb. annually available for delivery to the open market from July of this year, two-thirds of the output being uncommitted. Other producers are the N.R.C. Metals Co., and the United States Industrial Metals Co.

Hafnium-free zirconium is of considerable interest in certain types of atomic reactors as a structural material and, more important, as a cladding material for fuel elements. However, fuel temperatures in the range of 600 deg. F. for cladding and 900 deg. F. for structural parts as well as other types of reactors may be needed to achieve cost rates for power generation competitive with conventional sources. These conditions may be beyond the physical capabilities of zirconium, forcing the use of lower cost but more inefficient materials such as stainless steels, or higher cost materials such as columbium.

Present costs of zirconium must be reduced drastically before nuclear power, using zirconium-clad fuel elements, can become competitive with large-scale conventional electric power, even if operating conditions permit the use of zirconium. The possibilities of substantial cost reductions do exist, however, through higher production rates and improved fabrication techniques.

An important element in the cost structure lies in the scrap, so that scrap recovery and utilization could be of marked benefit. New methods, possibly utilizing pyrometallurgical techniques, may prove of promise.

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Among non-nuclear applications, zirconium metal powder has largely replaced ductile zirconium as a "getter" in vacuum tubes. This use is now of the order of 10,000 lb. annually compared with a few hundred pounds of ductile metal. Other applications for powder absorb some 5 tons or more annually.

In summary, however, it appears that non-nuclear requirements will be a minor segment of the overall demand for zirconium during the next few years; but as prices of ingot are reduced and as more information is gathered concerning the applicability of zirconium in various corrosive media, non-nuclear use will expand considerably. Usage might reach a level of 1,000,000 lb. (500 tons) per annum within the next five years or so.

The Beryllium Picture

Beryllium has inherent properties, and imparts certain properties to other metals, that make it attractive for research and development activities. On the other hand, high cost, limited availability of high-grade raw material supply, and toxicity, offer virtually insurmountable obstacles to mass production. The present major commercial use of beryllium is in alloying with copper to impart special improved fatigue, corrosion, heat and wear qualities. Other commercial applications include alloying with nickel to improve tensile strength and heat treatability, and use of the oxide in special ceramics.

The possible use of the metal in other fields, however, is where present interest lies. Beryllium has light weight and low neutron capture cross section. Last autumn, the A.E.C. announced the awarding of contracts to Brush Beryllium and Beryllium Corporation to produce 500,000 lb. each over a five-year period at an average price of $49

On March 12, 1957, at the forty-fourth Annual Convention of the National Association of Waste Material Dealers Inc. held in Chicago, Mr. D. D. Moore outlined the apparent future development of such metals as titanium, zirconium, beryllium, molybdenum, nickel, cobalt and magnesium. The following article presents a condensation of his remarks. Mr. Moore is chief of the Industrial Economics Division of the Battelle Memorial Institute, Columbus, Ohio.

per lb., or about half the price of the atomic grade beryllium available at that time.

Beryl is the only ore of beryllium that is currently of commercial importance. World output amounted to approximately 8,700 tons in 1955, with U.S. production constituting 500 tons. A major difficulty of the ore has been its brittleness, although if a suitable alloy were developed, greatly increased demand would be assured.

Molybdenum's Future Linked With Steel

In 1955 the United States produced about 92 per cent of the world output of molybdenum concentrates, amounting to almost 62,000,000 lb. of contained molybdenum. About 70 per cent of the molybdenum produced is consumed in steels, about 15 per cent in cast iron and malleable castings, and the balance in compounds and as the pure metal.

The future of molybdenum is inextricably linked to that of stainless and alloy steels and cast iron. Taking into account the increasing need for stainless and higher alloys, by 1965 consumption of molybdenum in that field should be in the range of double present requirements. Chemical usage may also be expected to expand and the metal is used in certain specific high temperature applications.

Special

Molybdenum as a metal has attracted considerable attention in recent years because of its very high melt point (4,720 deg. F. +/− 18 deg. F.). The need for metals with better high temperature characteristics has been one of the limiting factors in the development of jet engines, missiles and nuclear electric power generation. Unfortunately, certain characteristics limit molybdenum's usefulness. Considerable research is being conducted on molybdenum metal and it is reasonable to assume that this will lead to a decided expansion in usage during the next few years. But until a technological breakthrough occurs, it is believed that molybdenum's use as a metal will remain a minor factor in the market for the metal.

During the past few years, stockpiling requirements and the impact of current defence needs have kept nickel in short supply. This condition has forced those concerned with the development of new and improved alloys to design away from nickel in so far as was practicable. By so doing, the peacetime usage of nickel has been kept relatively constant in the face of an expanding economy and a greater need for metallic materials.

There is good reason to believe that the availability of nickel will soon change from one of controlled scarcity to one of relative abundance. Inco's Mystery-Moak Lakes project in Manitoba—to be completed in 1960 or 1961—will increase the company's productive capacity some 50 per cent to some 197,500 tons. Total Free World capacity in 1955 was estimated at 213,500 tons. It has been forecast that this capacity will increase by 1960 to between 300,000 to 312,500 tons. This is approximately 162,500 tons in excess of present civilian consumption. Obviously, unless defence needs remain quite high, the development and expansion of uses for nickel in the Free World must be stimulated to maintain high production rates.

Assuming a continued need for defence equipment, the demand for primary nickel may well be in the range of 225,000 to 275,000 tons per annum by 1965, providing assured supplies can be foreseen.

Cobalt is produced as a by-product associated with the recovery of other metals, principally copper. As such, the available supply is a function of the demand for other metals. Unless and until new deposits are located or technologies developed to recover cobalt at lower cost, there can be little flexibility in production to meet fluctuations in demand.

Growth has been substantial but sporadic. Output reached 8,300,000 lb. in 1950 and climbed to 10,800,000 lb. in 1952, but has since declined to 9,700,000 lb. in 1955. World productive capacity is considerably above civilian demand, and with the U.S. stockpiling goal for cobalt near completion, the price has been reduced from $2.60 to $2 per lb. by Africa Metals Co., American sales outlet for Union Minière du Haut Katanga in an effort to stimulate interest.

The principal metallic uses for cobalt are in high temperature alloys and in permanent magnets. The principal use for the cobalt-base super alloys has been in aircraft jet engines. Because of the limited availability of cobalt, there has been a deliberate attempt to design away from its use, as in the case of nickel. Although cobalt is generally considered superior to nickel in high temperature applications, wide increases in operating temperatures await the development of completely new alloys or other materials.

Indeed, considerable research is still under way to uncover new alloys and applications, and there is every reason to believe that peacetime uses for cobalt in high temperature applications will be expanded considerably. By 1965, it is reasonable to assume that civilian markets can be developed that would double present consumption rates if continuing supplies of cobalt are deemed adequate.

Metals

Should the possible production rates of cobalt be increased substantially, applications for treatment of the metal not deemed feasible under present conditions would be rapidly developed.

As the lightest of the structural metals in common use, magnesium holds considerable interest in a variety of applications where weight becomes a major consideration. The growth of these structural uses, however, is contingent upon the development of improved alloys and fabrication qualities. The virtually limitless supply of raw materials kindles the desire to find real tonnage applications of economic realization.

Civilian consumption of magnesium has resumed its upward trend, reaching 46,000 tons primary and 9,500 tons secondary metal in 1955. It seems reasonable to assume that civilian consumption should reach the 100,000 ton mark by 1965 or so.

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Beryl is the only ore of beryllium that is currently of commercial importance. World output amounted to approximately 8,700 tons in 1955, with U.S. production constituting 500 tons. A major difficulty of the ore has been its brittleness, although if a suitable alloy were developed, greatly increased demand would be assured.

Molybdenum's Future Linked With Steel

In 1955 the United States produced about 92 per cent of the world output of molybdenum concentrates, amounting to almost 62,000,000 lb. of contained molybdenum. About 70 per cent of the molybdenum produced is consumed in steels, about 15 per cent in cast iron and malleable castings, and the balance in compounds and as the pure metal.

The future of molybdenum is inextricably linked to that of stainless and alloy steels and cast iron. Taking into account the increasing need for stainless and higher alloys, by 1965 consumption of molybdenum in that field should be in the range of double present requirements. Chemical usage may also be expected to expand and the metal is used in certain specific high temperature applications.

Special

Molybdenum as a metal has attracted considerable attention in recent years because of its very high melt point (4,720 deg. F. +/− 18 deg. F.). The need for metals with better high temperature characteristics has been one of the limiting factors in the development of jet engines, missiles and nuclear electric power generation. Unfortunately, certain characteristics limit molybdenum's usefulness. Considerable research is being conducted on molybdenum metal and it is reasonable to assume that this will lead to a decided expansion in usage during the next few years. But until a technological breakthrough occurs, it is believed that molybdenum's use as a metal will remain a minor factor in the market for the metal.

During the past few years, stockpiling requirements and the impact of current defence needs have kept nickel in short supply. This condition has forced those concerned with the development of new and improved alloys to design away from nickel in so far as was practicable. By so doing, the peacetime usage of nickel has been kept relatively constant in the face of an expanding economy and a greater need for metallic materials.

There is good reason to believe that the availability of nickel will soon change from one of controlled scarcity to one of relative abundance. Inco's Mystery-Moak Lakes project in Manitoba—to be completed in 1960 or 1961—will increase the company's productive capacity some 50 per cent to some 197,500 tons. Total Free World capacity in 1955 was estimated at 213,500 tons. It has been forecast that this capacity will increase by 1960 to between 300,000 to 312,500 tons. This is approximately 162,500 tons in excess of present civilian consumption. Obviously, unless defence needs remain quite high, the development and expansion of uses for nickel in the Free World must be stimulated to maintain high production rates.

Assuming a continued need for defence equipment, the demand for primary nickel may well be in the range of 225,000 to 275,000 tons per annum by 1965, providing assured supplies can be foreseen.

Cobalt is produced as a by-product associated with the recovery of other metals, principally copper. As such, the available supply is a function of the demand for other metals. Unless and until new deposits are located or technologies developed to recover cobalt at lower cost, there can be little flexibility in production to meet fluctuations in demand.

Growth has been substantial but sporadic. Output reached 8,300,000 lb. in 1950 and climbed to 10,800,000 lb. in 1952, but has since declined to 9,700,000 lb. in 1955. World productive capacity is considerably above civilian demand, and with the U.S. stockpiling goal for cobalt near completion, the price has been reduced from $2.60 to $2 per lb. by Africa Metals Co., American sales outlet for Union Minière du Haut Katanga in an effort to stimulate interest.

The principal metallic uses for cobalt are in high temperature alloys and in permanent magnets. The principal use for the cobalt-base super alloys has been in aircraft jet engines. Because of the limited availability of cobalt, there has been a deliberate attempt to design away from its use, as in the case of nickel. Although cobalt is generally considered superior to nickel in high temperature applications, wide increases in operating temperatures await the development of completely new alloys or other materials.

Indeed, considerable research is still under way to uncover new alloys and applications, and there is every reason to believe that peacetime uses for cobalt in high temperature applications will be expanded considerably. By 1965, it is reasonable to assume that civilian markets can be developed that would double present consumption rates if continuing supplies of cobalt are deemed adequate.

Metals

Should the possible production rates of cobalt be increased substantially, applications for treatment of the metal not deemed feasible under present conditions would be rapidly developed.

As the lightest of the structural metals in common use, magnesium holds considerable interest in a variety of applications where weight becomes a major consideration. The growth of these structural uses, however, is contingent upon the development of improved alloys and fabrication qualities. The virtually limitless supply of raw materials kindles the desire to find real tonnage applications of economic realization.

Civilian consumption of magnesium has resumed its upward trend, reaching 46,000 tons primary and 9,500 tons secondary metal in 1955. It seems reasonable to assume that civilian consumption should reach the 100,000 ton mark by 1965 or so.

Surveying and Controlling

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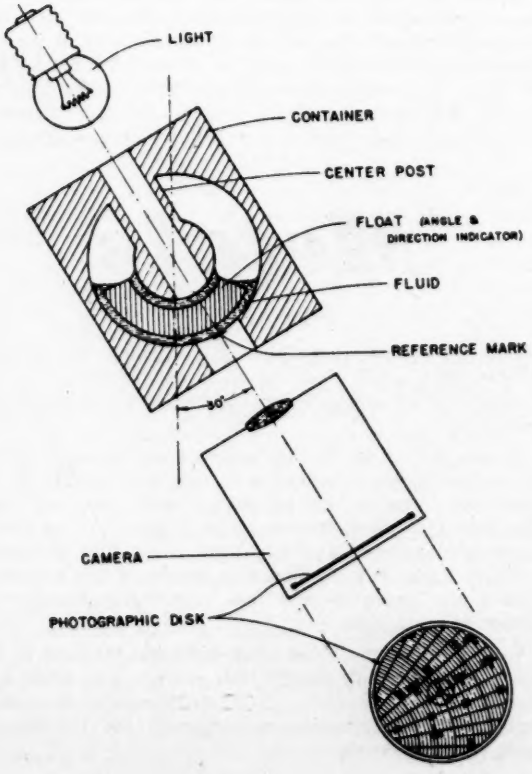
A HOLE may be drilled vertically or deflected from a vertically drilled hole. There usually is a saving in time and money by starting directional drilling from a determined location rather than attempting to drill a perfectly directed hole from top to bottom.

Directional drilling will produce a curved hole, the position of the bottom being checked at intervals by surveys. The most popular tool is the whipstock. This is a cylindrical chrome-steel casting with a round, concave groove in its inclined face, tapered at 3 deg. from a collar at the upper end to the edge of the tool near the bottom. The chisel-shaped lower end, when forced into the cement plug in the hole at the point of deflection, prevents the whipstock from turning.

Operation of the Whipstock

A hole was whipstocked from one of the holes in the series drilled at the Eureka Corporation, United States. The deflection of the hole was started 978 ft. below the surface. A 9-in. whipstock, using a 7¼-in rathole bit, was used to deflect a 10-in. hole. Different lengths of run were made depending upon the formation drilled and the desired deflection, but usually a 12- to 15-ft. rathole gave maximum results. After the rathole was drilled, the whipstock was pulled to the surface. The outside collar on the retrieving sub engaged the collar on the whipstock and brought the whipstock out of the hole. A pilot reamer was then used to ream the rathole to correct size, and drilling of the deflected hole was started with a 9⅞-in. bit. The purpose of drilling the deflected hole was to obtain information 200 ft. horizontally from the bottom of the vertical hole that had been drilled. Drill hole surveying methods were used to obtain accurate bearings and dip of the hole. To reach the desired objective this hole was surveyed many times, with 10 whipstock settings in the deflected hole.



The 0 deg. to 70 deg. angle and compass unit

A whipstock was then assembled on the derrick floor. The assembly consisted of the whipstock, retrieving sub, and non-magnetic sub and bit. The collar at the top of the whipstock was large enough to allow the drill pipe to pass through it but too small to pass the bit. The whipstock could thus be removed with the drill column when desired.

Use of the Compass Units

A K-Monel metal (non-magnetic), high-strength orienting collar was then made up on the free end of the retrieving sub. A ⅞-in. dia. shear bolt passed through the collar of the whipstock into the retrieving sub, so that the whipstock could be turned by rotating the drilling string. The whipstock assembly was then lowered to the top of the cement plug in the conventional manner by adding sections of drill pipe. When landed in the hole, the whipstock was faced in the direction of deflection.

The two angle and compass units used in the survey were the only non-friction apparatus available for determining deviations of boreholes from the vertical and the direction of deviation.

The principle and operation of the 0 deg. - 70 deg. angle and compass unit may be described as follows:

If a hollow sphere is floated in fluid it is free to rotate about any axis. If a sector is cut from the sphere and allowed to float in the fluid, the only axis about which it can rotate is one which is perpendicular to the surface of the fluid. If the sector of the sphere and its fluid are confined in a spherical cavity container which has a centre post with a sphere at its lower end, the sector will remain accurately centred, yet will be able to rotate about its axis. If magnets are installed in the floating sector, it will always orient itself to the magnetic field of the earth by rotating about its own axis. The container may be tilted to any position up to and including an inclination of 70 deg. from the vertical without affecting the float, because the surface of the fluid always remains parallel to the surface of the earth.

In the Homco-Kuster single-shot survey instrument and inclinometer a camera in the lower part of the unit records reference marks in relation to the engraved surface of the float.

After the whipstock is lowered into the drill hole to

A note describing the use of a whipstock to achieve deviation in vertical drilling appeared in our issue of March 8, 1957. The particular reference applied to drilling for oil, and hence the application of the technique to lead, silver and gold-bearing ores at the property of Eureka Corporation, in Nevada, is of particular interest. The following article, condensed from "Information Circular 7768," published by the U.S. Bureau of Mines, describes the use of a whipstock at Eureka.

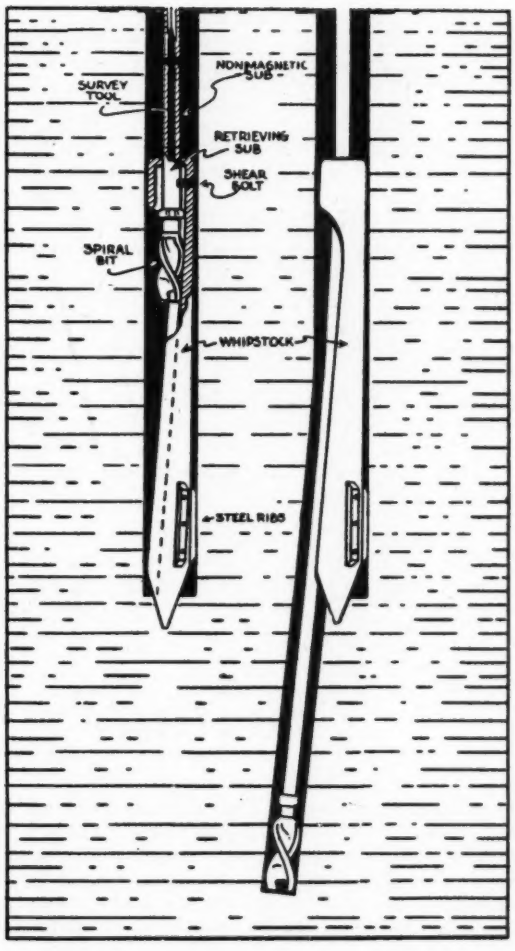
Direction in Drill Holes

the depth at which it is desired to deflect the hole, the whipstock must be oriented in the direction in which the hole is to be deflected. There are two methods by which this may be accomplished, namely, the direct method, when the inclination of the hole off vertical does not exceed 12 deg. and the indirect method, when the existing angle exceeds 12 deg.

The Direct Method

When the survey instrument has been lowered on a wire line down through the drill pipe to the whipstock, the instrument case seats on a collar so placed in the orienting collar that the shadowgraph in the instrument will be exactly in a plane with the magnets in the orienting collar. The magnets lock the shadowgraph so that the black-dot-marked end of the needle points to the north magnet in the collar; thus the shadowgraph needle in the instrument gives a reference with relation to the face of the whipstock attached to the sub and collar. Meanwhile, the floating disc compass aligns itself with the magnetic field of the earth. The clock has been set to allow ample time for the survey tool to be lowered and seated. The survey instrument is hoisted to the surface, and the film disc is transferred to the developing tank. Then from the film disc, it can be readily determined which way the whipstock is facing and how many degrees to turn it in the desired direction.

The whipstock is then turned in the correct direction by rotating the drill column; weight is put on the drilling string to force the pointed end of the whipstock in the cement plug to secure the whipstock in position. Additional weight is then put on the drill stem to shear the pin that links the whipstock to the retrieving sub, thus freeing the bit and drilling string and permitting the bit, attached to the drill stem, to slide down the channelled face of the whipstock. The drill stem is then rotated and drilling the deflected hole is started.

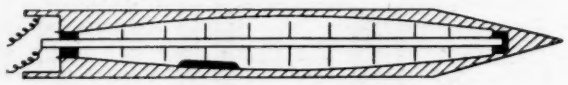


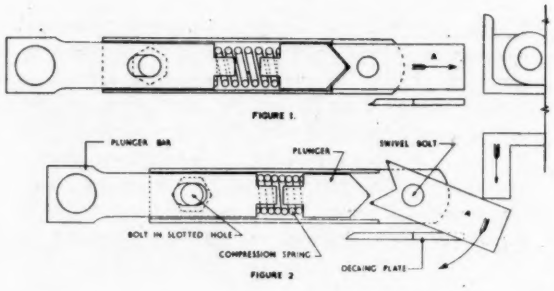
Diagrammatic explanation of operation of the whipstock

In the indirect method, the survey instrument is made up with the single-shot unit. All vertical holes tend to deviate from the vertical. To determine the bearing and inclination of the hole at the predetermined point of deflection, the survey instrument with the single-shot unit is lowered to this point, and a picture of the bearing and inclination is taken and recorded.

Final Direction Check

After the cement plug at the deflection point is set, the whipstock assembly is lowered in the drill hole, and the survey instrument containing the indirect unit is run. This unit consists of a transparent floating disc compass, a lens, and a plumb bob hung by wire lines from the centre of the unit. Below the plumb bob is the photo disc that records the image of the plumb bob as it appears on the locked compass. By comparing a picture with the photo disc showing the direction which the more or less vertical hole slants (previously taken with the single shot instrument in the hole), the direction the whipstock is facing can be readily determined. The whipstock is then turned in the desired direction by rotating the drill column. Weight is then put on the drilling string to force the pointed end of the whipstock in the cement plug to secure it in position. The bit and drilling string are freed.





At left is the steel tube type of inclinometer used in testing borehole divergence, and above is the safety head for cage stop release gear rams. In this illustration Fig. 1 shows the device with ram in operation, and Fig. 2 the safety action when the head is fouled by the descending cage

IT is of interest to record that many of the developments recently reported in the U.K. coal mining industry have been achieved as a result of the technical knowledge of working personnel of the industry.

A safety head for cage stop release gear rams to prevent damage when the head is fouled by the cage due to inaccurate decking has been designed in Northumberland. The safety head will swivel upwards or downwards, and a spring-loaded plunger causes it to snap clear of the shaft until it is re-set by foot pressure.

The head consists of a plunger bar, spring, plunger and head, all contained in a box-section housing. The bar, plunger and head are all made from mild steel, 1¼ in. sq. The principle of the device is suitable for any mechanism liable to fouling in this way.

Developments in Britain's Coal Mining Industry

Techniques of underground gasification, which are now being explored by the N.C.B., involve the drilling of long boreholes which throughout their length must remain in the coal seam. To ensure that this happens some form of instrument is necessary to measure the extent to which the borehole is diverging from the horizontal. Two forms of inclinometer have been developed for this purpose.

The instruments are operated electrically, employing the system of varying the resistance of a circuit passing through the inclinometer to register changes in the inclination of the borehole in which the instrument is placed. Both instruments use a pellet of mercury to produce the necessary variations in the resistance of the circuit. They are the two most promising forms of the instrument to be developed so far.

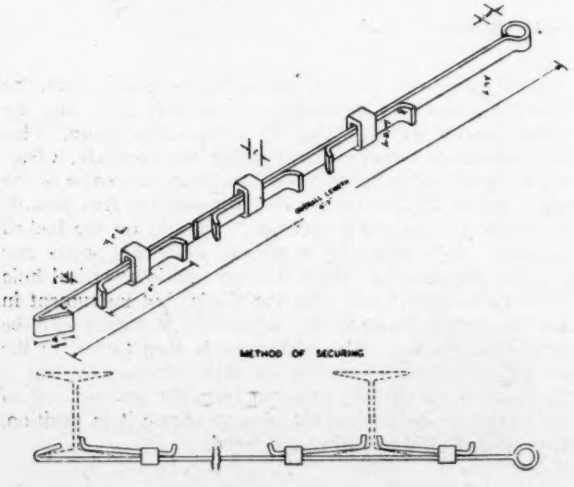
One form consists of a steel tube which, internally, is cigar-shaped. Along the central axis is a rod carrying a series of electrically-conducting discs each of a diameter slightly smaller than that of the container at that point. Between each pair of discs is a high-resistance electrical path either through the central rod, as shown, or through fine wire windings. The tube is sealed and contains a pellet of mercury sufficiently large to complete the circuit between any one of the discs and the instrument's steel shell, but not big enough to make contact with more than two of the conducting discs.

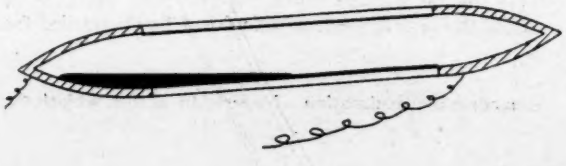
As the tube is tilted, the pellet makes electrical contact to embrace a greater or lesser number of the resistance elements in the circuit, and thus changes in resistance can be calibrated as changes in inclination.

A different form of instrument consists of a plain tube, either of glass or other material, and either coated on the inside with an extremely thin low-conductivity film of platinum or having itself a low but positive conductivity. A path of higher conductivity is provided by mercury, sufficient of which is introduced to make contact from end to end of the tube when horizontal. When the tube is tilted, the resistance of the circuit is increased as the gap between the mercury and the end contact increases.

Because arch girders which have been newly set in gate roadways are not very stable, it has become general practice in at least one division of the N.C.B. to fasten the last six arches of a roadway one to another, thus ensuring that they are not disturbed by shotfiring or accidental blows. This is done by securing tie bars from arch to arch, and moving them forward as the roadway is advanced.

Below, the arch girder stabilizer developed by the N.C.B., and at right is a plain tube inclinometer made of glass or other material for borehole divergence





Machinery and Equipment

Hydraulic Prop Test Rigs

To cater for service testing, Dowty Mining Equipment Ltd. produce two types of test rigs designed specially for Dowty props. The larger of the two is a robust, full-size rig intended for surface use at collieries and area workshops; the smaller is a strong, light, portable unit for prop testing at the coal face. Both provide for accurate, easy and speedy testing of Dowty Standard and Monarch props of all sizes.

The basis of each rig is a hydraulic ram, fed by a hand pump which draws fluid from a reservoir and delivers also to a gauge and a stop valve. The latter, when opened, allows the ram pressure to be dissipated to the reservoir. In the standard rig this hydraulic equipment is located at the base of a strong steel framework, the upper part of which carries an adjustable bracket secured in position by two pins inserted through holes in the vertical steel members. The prop slips into a socket above the ram and rests on a self-aligning adaptor which ensures axial loading of the prop. This is easily set against the adjustable bracket by means of the prop hand pump.

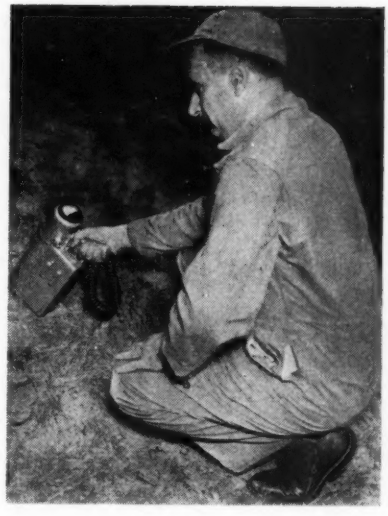
Operation of the test rig hand pump then builds up ram pressure quickly and easily, extending the ram against the prop base and simulating roof load. The thrust developed is indicated on the gauge, clearly calibrated in tons. At the relief pressure, the prop relief valve opens and further operation of the pump results in closure of the prop.

Adjustment of the upper bracket to suit prop size is a simple operation requiring only removal of the two pins, raising or lowering of the bracket and replacement of the pins. Initial filling and topping up is by means of an easily accessible filler cap in the reservoir casing, and an adjacent dipstick provides for quick checking of the fluid level. A filter between the reservoir and ram, and having a renewable element, safeguards the ram from foreign matter in the hydraulic fluid.

The portable rig is basically similar to the standard one but the steel framework is omitted, as the prop to be tested can be set against a roof bar on the face.

Only 18 in. high, this compact rig offers great advantages in use. It eliminates the need for transporting suspected props to the surface for testing, and only those proved to require servicing need be removed from the face. This limits replacements to the minimum.

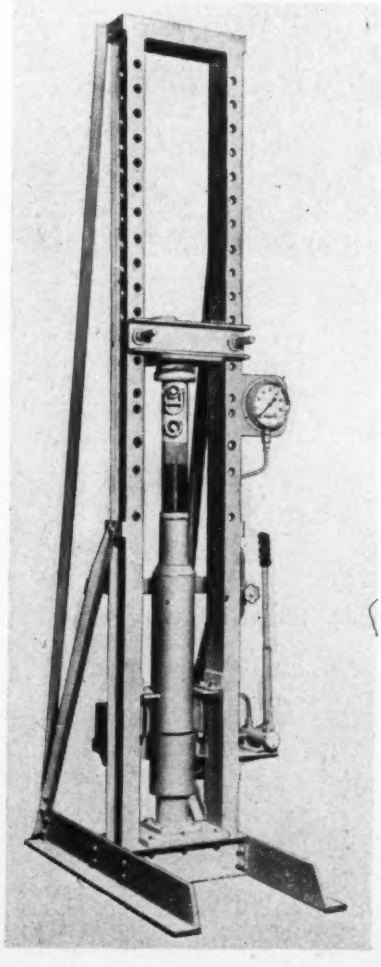
Each prop is able to perform a full useful life of uninterrupted duty and its condition can be guaranteed by regular, easily effected, checking. The reservoir cover is readily accessible and easily removed to allow visual check on the fluid level. A sledged base, two stout carrying handles and low weight ensure easy handling of the unit by two men.



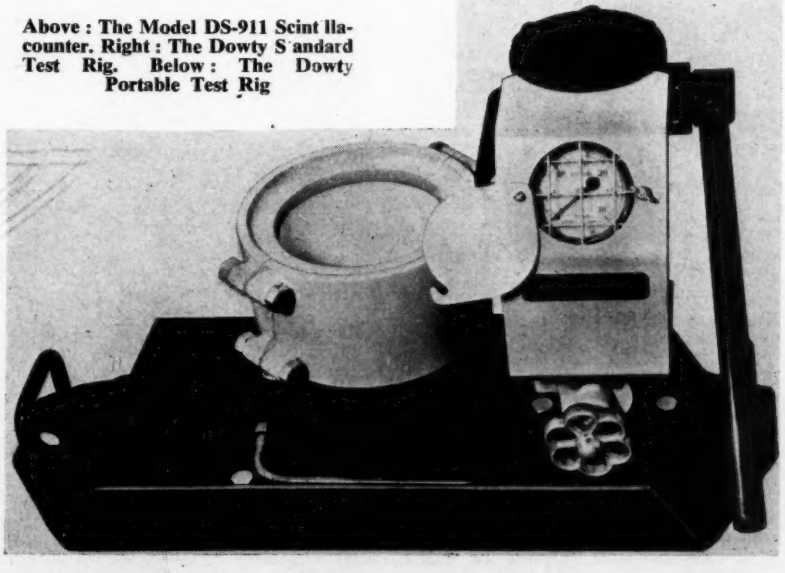
A NEW URANIUM DETECTOR

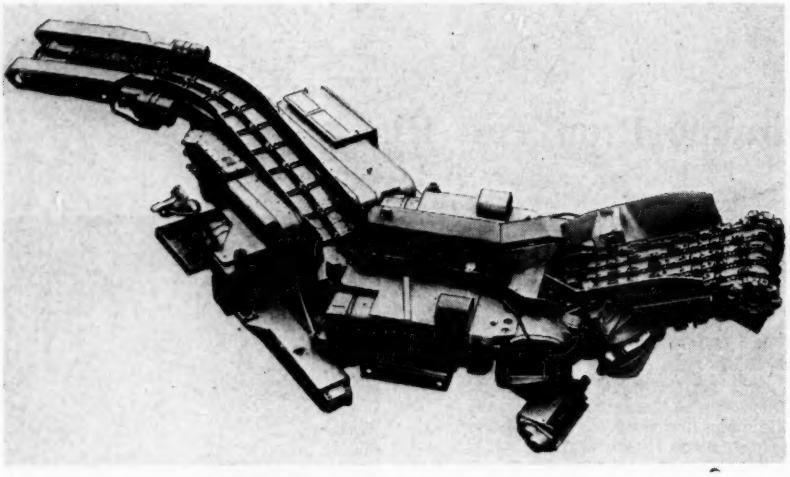
The Radiac Company, Inc., United States, announces the release for unrestricted public use of the Model DS-911 Scintillacounter for oil and uranium prospecting. The Scintillacounter, a gun-type scintillation survey meter, was originally built on a U.S. Government contract to meet U.S. Atomic Energy Commission and Geological Survey requirements for a radioactivity detector to be used for aerial and mobile uranium surveys, and for prospecting on foot.

Although it was originally designed for the detection of deeply buried uranium ore bodies, the Scintilla-



Above : The Model DS-911 Scint lla-counter. Right : The Dowty S andard Test Rig. Below : The Dowty Portable Test Rig





This view of the Joy 1-CM-2A Continuous Miner shows the flexibility of the front and rear conveyors. The model is the standard machine of the series

counter can also be used for locating oil and gas deposits through the radio-activity anomalies technique. Special features of the tool include an improved scintillation detection system with extremely high gamma sensitivity, a short resolving time and high counting rate. The newly designed high voltage circuit operates on standard low voltage batteries.

FILMING INSIDE BOREHOLES

A technique for taking cinematograph films inside the exploratory boreholes drilled during geological prospecting, or during the drainage of methane gas has been developed in the U.K.

The system depends on the use of a small cine-camera together with a special light-producing flash device and an unusual design of conical mirror. The whole system is mounted in a metal tube 2½ in. in diameter.

The conical mirror which is mounted on a glass window situated at one end of the tube forms the eye of the film camera. This mirror's unusual shape enables the film camera to take pictures of the rock formations all round the cylindrical walls of the borehole at the point the picture is taken.

Since the actual process of filming is electronically controlled from the top of the drill shaft by means of an electric cable the system should enable complete surveys of the strata of the rocks down the whole length of a borehole to be undertaken.

A CONTINUOUS MINER SERIES

Since they were first introduced to British collieries in 1949, the Joy Continuous Miners, supplied by Joy-Sullivan, Ltd., have proved themselves capable of operating under the widely varying mining conditions found in Great Britain. Latest in the line is the 1-CM-2 series, which replaces the 4-JCM models. In appearance there is little difference between the machines and the operating principle remains the same. The new machines are, however, stronger in construction and have a higher mining capacity—up to a possible four tons per min., working in seams of 52 in. and above.

The 1-CM-2 machine has a ripper head and front conveyor which swing approximately 35 deg. either side of centre, and are mounted on a turntable on top of the main chassis, carried on caterpillar tracks. The rear of the machine carries the controls, motors, contactor gear and a rear conveyor which can swing 45 deg. either side of the centre line, and from which the coal is discharged into pit transport.

The standard model of the new series—the 1-CM-2A—is equipped with a 5 ft. 6 in. multiple chain ripper bar which has five forged 9-bit-position chains, with double bit blocks and two 3-inch pine-apples carrying bits, mounted to reduce side pressure on the outside chains.

Two 65 h.p. water-cooled main motors drive the ripper head through bevel and helical gear bar gear cases which are an improvement over the old worm-type gear boxes used on the 4-JCM. Double-acting hydraulic shear jacks position the cutting head. Tractive power for the "Miner" is by two 7½ h.p. motors, one to each of the caterpillar tracks.

The improvements incorporated apply to the entire range of machines in the new series but on the 1-CM-2B model two RDU-2 roof bolting drills with dust collector apparatus are provided. The drills, controls, drill pump and motor, special cross tie, long rear conveyors, and special timber jack mountings increase the overall height of the machine from 45 inches to 63 inches, the width from 92 inches to 117 inches, and the length from 28 ft. 6 in. to 29 ft. 8½ in.

Third model in the 1-CM-2 series is the 1-CM-2C. This is similar to the 1-CM-2A model except that it has been designed to fit roof bolting drills in the future.

A major variation to the range is the use of a special large ripper head. With a direct connected shear ripper bar, direct connected sheer jacks and special sumping frame, a bar of seven feet length can be used, giving a cutting height of 120 inches. This variation is known as the 1-CM-4, and the machine is available in the forms designated 4A, 4B and 4C, to correspond exactly with the equipment of 1-CM-2 series.

In America the machines have already provided an increase in production of 40 per cent over conventional methods, working in a seam averaging eight feet thick with the mining height limited to seven feet. No figures are yet available for the machines operating in Great Britain, though four of the new series have recently been installed in Northumberland collieries.

A RANGE OF DRILL STEELS

Recent years have seen a complete revolution in rock-drilling technique, based on carbide-tipped drill steels, the advantages offered by these steels being that higher drilling speeds and smaller diameter holes can be achieved, and that longer drill-steel life and simplified re-sharpening give an increased effective drilling time.

The Uddia drill steels manufactured by Uddeholms Aktiebolag, Sweden, are of Uddeholm drill steel with carbide inserts. The rods are made of U.H.B. Clomco steel—a chrome molybdenum—and are available in ¾ in., ⅞ in. and 1 in. hexagon. The flushing holes on the ¾ in. and ⅞ in. rods are lined with stainless steel as a protection against corrosion fatigue.

The carbide inserts are, as a rule, of chisel type. The shank is usually 4¼ in. long and is collared, although the steels can be manufactured with a collared 3¼ in. shank or with a plain shank.

A REVIZED BRITISH STANDARD

The revized edition of B.S. 1975 relating to primary cells and batteries for intrinsically safe circuits in coal mines has been extended to include requirements for applications other than bell signalling circuits, to which the original edition, issued in 1953, was restricted. It now applies to Leclanché cells and batteries of the wet and dry types, and to air-depolarized cells whose output is limited to satisfy the requirements of the Ministry of Fuel and Power.

Standard dimensions of drv cells and batteries and of the components of wet cells are specified, together with requirements for containers, current-limiting resistors, connecting wires and terminals. The approximate metric equivalents of all dimensions are included.

The purity of the zinc electrodes and of the electrolyte for wet cells is specified and the performance requirements include details of the discharge and storage tests, together with current and voltage limitation tests.

The standard was prepared under the authority of the Electrical Industry Standards Committee. Copies of B.S. 1975: 1957 may be obtained from the Sales Branch, British Standards Institution, 2 Park Street, London, W.1, price 3s. 6d.

MECHANICAL ROCK CRUSHER

A mechanical rock crusher which is capable of breaking up 200 tons of rock per hour to sizes of less than 6 in., is being fabricated by Pegson Ltd. Believed to be the largest all-welded machine of its kind in the U.K., the crusher can handle rock measuring 30 in. x 24 in. x 30 in.

The drive is 125/150 h.p. and the crusher itself is a single-toggle roller bearing jaw machine measuring 42 in. x 30 in.

MINING MISCELLANY

Unesco is to set up an Institute of Mineral Research, to be attached to the University of Instanbul, Turkey.

★

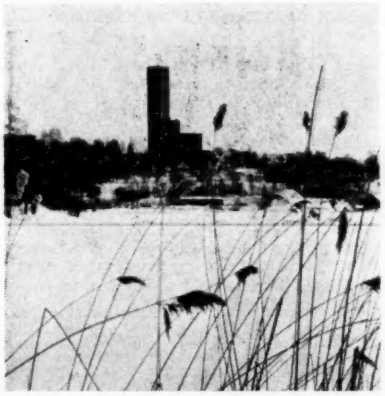
Important deposits of cassiterites with a 72 per cent tin content, are reported from the Rondon territory, Brazil.

★

The Montana silver lead mine has discovered at its Zeehan property, Tasmania, a substantial tonnage of copper-nickel ore averaging about 1½ per cent nickel.

★

Coal production in Turkey during 1956 totalled 5,888,308 (run of mine), an increase of 392,611 tons over the previous year.



The pithead at Uddeholm's Persberg mine, Sweden, as seen across the frozen lake. It will be recalled that last week we reported the formation of a new mining and civil engineering division for the sale of Uddeholm carbide rock-drill steels in the U.K.

In spite of the new re-formed Plateau Minesfield Police, illicit tin buying in Nigeria has increased during the year. As much as £10 per 70 lb. bag is being paid for illicit tin.

★

The reduced copper price means that the north Norwegian company Roros Kobberverk will probably have to reduce its labour force somewhat over the next two or three years.

★

The Johannesburg morning paper *Die Transvaaler* reports that the South African Minister of Mines has instituted an investigation into the position of marginal mines.

★

The O.E.E.C. is to set up a study group to prepare for the establishment of experimental reactors in which all the member-countries of the Organization can participate.

★

During an aerial survey completed by New Consolidated Gold Fields in Tanganyika's Eastern Province, instrument readings described as "remarkable" were obtained. The company has been granted an exclusive prospecting licence over the whole area concerned. From the aerial reconnaissance it appears likely that radioactive and other minerals may be yielded.

★

Plans are being made for the construction of a new steel-titanium plant on the south Pacific coast of Mexico. Compania Minera El Tisur, the Mexican affiliate of Republic Steel Co. will erect the plant at Pluma Hidalgo, state of Oaxaca, on the Gulf of Tehuantepec. Costs are said to be "several million pesos". Republic Steel has large ore reserves near Pluma Hidalgo. Harbour facilities at Pluma Hidalgo are also to be developed.

★

Four specially-fitted aircraft and 30-odd resources experts from Toronto and Oshawa are currently working in Venezuela in co-operation with its government and various exploration companies to develop the country's rich oil and hydro-electric power potential. More than half-a-dozen separate survey jobs being carried out by The Photographic Survey Corporation and its associate, Aeromagnetic Surveys Ltd. The surveys cover an area of 25,000 sq. miles all over Venezuela and are worth over $500,000.

★

Some 38,000 square miles of territory in Tanganyika and Bechuanaland will be surveyed from the air for the first time under contracts awarded by the Directorate of Colonial Surveys to Fairey Air Surveys. The surveys are part of the British Government's colonial development scheme. They will begin in the middle of next month and should be completed by the end of July.

★

The U.S. trade mission now touring Malaya has been informed by Malayan mining interests that private American capital investment would be welcomed by the country's mining industry. The mining interests are assumed to be thinking of the type of partnership that would provide the opportunity to share technical knowledge.

★

Pravda reports that recent mineral discoveries in the Soviet Union include some "extremely interesting" wolfram and molybdenum orebodies in Central Khazakhstan, while in the Pacific Coast region near Khaboravsk and in Yakutia substantial deposits of tin have been found that are said to be larger than those now being exploited in the U.S.S.R. It is also claimed that in the Tchita district of Siberia, east of Lake Baikal, discoveries include very large copper ore deposits near Udokan and molybdenum deposits near Borzya.

Tests using a Vibrair jig have shown that a 98 per cent recovery of rutile as a product carrying over 90 per cent mineral can be obtained at one pass on material screened between ⅜ in. and 10-mesh B.S.S.

Belcher Mining Corporation, through its wholly-owned subsidiary Wales Quebec Mines, has obtained two concessions on the southern portion of Quebec's Ungava country. The concessions amount to approximately 100 square miles west of the Lemoyne copper mines where important nickel-copper discoveries were made last year.

★

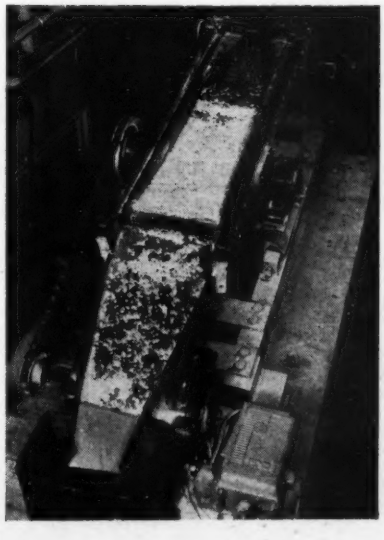
Recent excavations on the site of a new building to be built in the centre of Salisbury, Southern Rhodesia, have revealed gold bearing rock. The Director of Geological Survey in Southern Rhodesia has said that the city lies on the edge of one of the colony's goldfields, but that if even satisfactory deposits existed, they could not be worked as the site is within a surveyed township.

★

Geological exploration teams operating in the vicinity of Gnjilane, Yugloslavia, have discovered large deposits of leucite, a mineral from which potassium salts are extracted. Reserves are estimated at a billion and half tons, Leucite rock stretches over an area eight kilometres long and one kilometre wide and contains 50 per cent of pure leucite. The percentage of potassium salt totals 15 to 17.5 per cent which is entirely adequate for exploitation.

★

Rutile occurs in South-West Africa in shear zones in an altered granite at Giftkuppe, some six miles south of Kanona Siding. The outcrop is roughly rectangular in form and measures approximately 1,500 by 500 yds. High concentrations of rutile occur in an 8 ft. band on the northern side of an occurence of tremolite rock in a quarry in a S.E. zone. Some 60 ft. north of this band a further opening has disclosed bands of rutile up to one inch in thickness dipping northwards at 25 deg. in a further wide zone. Debris, covering the slopes of the hills, contains much eluvial rutile and quartz boulders. Many large crystals of rutile have been found in this



deposit, one of the largest measuring some 6 in. x 3 in., although much granular and fine material is also present. The rutile here was originally worked by simple methods, although currently no exploitation is taking place.

★

Sulphur deposits discovered and surveyed by Polish geologists in the region of Tarnobrzeg, Rzeszow voivodship, and at Piaseczno and Szydlow, Kielce voivodship, are estimated to contain 95,000,000 tons of pure sulphur. Main obstacles to exploitation are waterlogging and large quantities of hydrogen sulphide. National production is planned at 55,000 tons next year, a production of some 10,000 tons of pure sulphur. In the years 1959-1960 it is estimated that Poland will produce 60,000 tons of pure sulphur annually.

★

The annual report of the Nigerian Coal Corporation shows a record output for 1956 of 750,058 tons, an increase of 74,140 tons on the preceding year. A contract for delivery to Ghana of some 80,000 tons was filled and a similar contract for the next two years has been agreed. A production of 800,000 tons is forecast during 1957. A new mine, the Ekube, has commenced production in the Enugu coalfield. New output from the field is expected to reach 350,000 tons per annum by 1960.

★

Granite City Steel Co. and American Zinc, Lead and Smelting Co. have agreed to explore jointly for iron ore fields in Missouri. The agreement contemplates the development of mining properties for the use of both companies, in the extent of commercial ore discoveries being made. Expenses of exploration and development will be shared equally. The announcement follows the disclosure by St. Joseph Lead Co. that it has discovered a major iron ore deposit about 40 miles north-west of Bonne Terre, Missouri.

★

A total width of 242.5 ft. of magnetite iron ore has been intersected so far in the first diamond drill hole to be drilled on Quebec Labrador Development Co. Ltd.'s property in the Papaonga Lake area. The hole is still drilling with a depth objective of approximately 800 ft. Quebec Labrador Development's property is located about eight miles southwest of the property of El Sol Gold Mines Ltd., approximately 65 miles northwest of Sioux Lookout, Ontario. Operations of Quebec Labrador Development are directed by Continental Mining Exploration Ltd.

★

The West Pakistan Government is to set up a Mineral Development Corporation. Apart from mining, the Corporation will also conduct detailed deep-bore surveys of mineral deposits. The Corporation will employ both foreign and Pakistani technical experts, and will be fully equipped. The government has earmarked Rs. 10,000,000 for the Corporation, which will not have the sole monopoly of the country's minerals, but will receive preference in getting mining leases of important minerals. The Corporation will also promote and participate in private mining companies. The government is taking immediate steps to establish a mining wing under the Directorate of Industries to enforce mining regulations, grant prospecting licences and mining leases, and collect royalties.

PERSONAL

Sir Robert Jackson, Australian Special Commissioner for the Volta River project, has been appointed first chairman of Ghana's Commission for Development with effect from July 1. It is understood that in this capacity he will administer the Ghana government's programme for economic development.

★

The Rt. Hon. Viscount Malvern of Rhodesia and Bexley, and Sir Charles Cumings have been appointed directors of the British South Africa Co. The appointment of Colonel Sir Ellis Robins, vice-president of the company, as the company's principal representative in Southern Africa was terminated from April 5, 1957, and he has been appointed a member of the executive committee of the board in London from that date. Sir Charles Cumings succeeds as the company's principal representative in Southern Africa.

★

General Mining and Finance Corporation has announced the following appointments: Mr. M. C. G. Meyer, a consulting engineer of the corporation, has retired and Mr. J. A. Becking appointed to fill this vacancy. Mr. J. A. Nixon, formerly manager of Buffelsfontein Gold Mining Company, appointed an assistant consulting engineer.

★

Sir Andrew Strachan has joined the board of Tanganyika Concessions. Sir Alfred Beit has left the board, but has accepted a seat on the advisory committee.

★

Sir Charles Cumings has joined the boards of Mufulira Copper Mines and Rhodesian Anglo American. Colonel Sir Ellis Robins has left the boards.

★

Mr. D. A. B. Watson has been appointed a director of De Beers Consolidated Mines Ltd. in place of the late Mr. G. J. Joel.

★

Mr. A. R. O. Williams has been appointed chairman of the South West Africa Co., Mr. G. J. Mortimer has been appointed managing director.

★

Mr. J. O. Hitchcock, a director of the Mond Nickel Co., has been elected a director of Henry Wiggin and Co.

★

Mr. L. C. Walker has resigned from the board of the National Mining Corporation and of the London and African Mining Trust.

★

Mr. C. J. Burns has been appointed a director of Ariston Gold Mines (1929) Ltd.

★

Mr. P. D. O'Brien and Mr. B. E. A. Vigers have resigned as joint managing directors of Laporte Titanium. They remain chairman and vice-chairman respectively. Mr. W. Woodhall, a director and general manager of Laporte Titanium, has been appointed managing director.

★

Mr. G. C. H. Matthey has been elected chairman of Johnson Matthey and Co. following the recent death of Mr. H. W. P. Matthey.

★

Mr. G. C. Payne has been appointed reconstruction director of the National Coal Board's reconstruction department in its North-Eastern Division. Mr. Payne, who is general manager of the No. 3 (Rotherham) area, will take up his appointment on May 1.

★

Mr. G. McK. Thomson has been appointed divisional chief engineer of the West Midlands Divisional Coal Board. The post was rendered vacant by the death of Mr. R. M. Walton.

★

Mr. J. D. Olding, founder of Jack Olding and Co. Ltd., has relinquished his position as chairman of the board of directors and has been appointed president of the company. Mr. A. O. Bluth is chairman.

★

Mr. F. F. L. Morgan has been appointed a director of the Climax Rock Drill and Engineering Works. Mr. J. T. Holman has resigned from the board.

★

The Consolidated Pneumatic Tool Co. Ltd. has formed a new company called the Consolidated Pneumatic Tool Co. (India) Pvt., Ltd. Mr. V. Nimbkar is managing director, and others on the board are Mr. G. J. Coffey and Mr. N. Redman. The new company will operate from Bombay where factory premises will be constructed.

★

The Lead Industries Association has announced that it will sponsor a fellowship in the Department of Ceramic Engineering, University of Illinois, for the academic year 1957-1958 for research on lead in ceramics.

★

After Easter the address of The Premier Lamp and Engineering Co. Ltd. will be Pleco Works, Barras Garth Road, Leeds, 12. Telephone: 63-8098/9.

CONTRACTS AND TENDERS

The I.C.A. has announced the following future authorizations:

India

Eight centrifugal pumps, details Ten/25109 of 3/4/57. Closing date, April 23, 1957. Ref.: E.S.B./8169/57. Telephone enquiries Chancery 4411, extension 738 or 771.

South Africa

Two hundred and forty tons antimony, minimum purity 99.5 per cent, details Ten/25139 of 4/4/57. Closing date April 26, 1957. Ref.: E.S.B./8304/57. Telephone enquiries to Chancery 4411, extension 738 or 771.

Turkey

Pig lead, desilvered, 99.5 per cent purity. Details Ten/25219, of 5/4/57. Closing date April 20, 1957. Ref.: E.S.B./9148/57/I.C.A. Telephone enquiries Chancery 4411, extension 360.

★

Mitchell Engineering and its American associates AMF Atomics Inc., of New York, have received an order from Rheinisch-Westfalisches Elektrizitatswerk A.G. of Germany for a closed cycle boiling water nuclear power plant designed to give an electrical output of 15 megawatts. The order is worth $5,300,000 (£1,900,000). Of this, Mitchell's share will be over $3,000,000 (£1,100,000).

Metals and Minerals

Bright Uranium Prospects for South Africa

The South African gold and uranium mining industry has been warned by the chairman of the U.K. Atomic Energy Authority, Sir Edwin Plowden, that uranium producers will eventually have to face competition from other parts of the world and from other factors that would influence atomic energy planning. However, Sir Edwin, who was the guest of the Transvaal and Orange Free State Chamber of Mines at a dinner in Johannesburg, expressed the view that most of the South African mines would compete profitably for many years—decades, probably—in any foreseeable market.

★

Commenting on a recent announcement that the U.K. Atomic Energy Authority was prepared to buy Rhodesian concentrates containing 500 tons of uranium oxide each year, and that it would shortly offer to buy uranium ores containing 100 tons of uranium oxide, Mr. Branscombe, head of the Authority's office in Salisbury, said there was " every possibility" that the Rhodesian Federation would eventually be able to supply up to 600 tons of uranium oxide to Britain. There is no likelihood, however, that advantage can be taken of the offer in the immediate future.

The formation of a third syndicate to exploit uranium claims at Zimunya, near Umtali, in Southern Rhodesia, was recently announced. Representatives of an overseas company are coming to inspect this syndicate's holding—known as the Rio Grande claims—this month. Another concern, the Cripmore Syndicate, has pegged five blocks, totalling about 140 claims, over which Anglo American hold a two-year option. The third syndicate, Manicaland Mineral Ventures (Pvt.) Ltd., holds about 800 claims in 36 blocks. Samples of the ore in these claims have been sent to the U.K. Atomic Energy Authority.

★

Germany is to follow Britain's policy of building atomic reactors on the basis of natural uranium, said Herr Balke, Minister for Atomics, on his return from visiting the U.K., Canada and the U.S. Herr Balke said he had discussed in Canada a contract for 500 tons of natural uranium, which would be sufficient to meet German needs for a large number of years.

Sweden's uranium requirements for making fuel elements are expected to total 20 tons per annum by 1960, rising to 75 tons by 1965 and some 200 tons by 1970. To meet these requirements the semi-State-owned nuclear development company, AB Atomenergi, proposes to establish a uranium extraction plant capable of producing 100 tons of uranium per annum, which is to be completed in the early 1960's. When in full operation the plant would process some 2,000 tons of shale per 24 hours.

CAPE YORK BAUXITE

The newly-discovered bauxite deposits at Cape York Peninsula, in North Queensland, have been described as greater in volume than all the other known deposits in the world combined. Australia's Minister for National Development, Senator Spooner, predicts that the discovery will result in the establishment of large centres of population in what is at present virtually an untouched area. Senator Spooner said that in the comparatively near future open-cut mining operations would begin on a large scale and would be followed by the establishment of big chemical treatment plants employing thousands of workers. The next stage would be the conversion of the bauxite to aluminium, for which a smelting plant, probably driven by atomic power, would be required. In this connection it is pertinent to recall that the possibility of atomic energy as a solution to the problem presented by the Cape York bauxite deposits was mooted in this column several months ago (*The Mining Journal*, 9/11/56, p. 568).

★

The U.S. Bureau of Foreign Commerce of the Commerce Department has announced a slight relaxation in requirements to export aluminium scrap and re-melt ingots. The licensing policy and requirements for aluminium scrap and remelt ingots exported from the Continental U.S. will remain unchanged, but scrap and ingots originating in a U.S. territory or possesion outside the Continental U.S. may now be exported without regard to quantitative limitations.

This relaxation has been made possible " because of improved domestic supply ". In this connection it may be noted that, with power restored in the Pacific Northwest and more working days, U.S. production for March at 135,500 s.tons was more than 16,000 tons higher than that of the previous month. First quarter output is estimated at 401,500 tons.

MAGNESIUM'S LATEST RECORD

Continuing the trend which has been conspicuous since the beginning of the final quarter of 1956, the primary magnesium industry in the U.S. set up a new peacetime ingot production record in January, 1957, when output amounted to 7,111 s.tons, which compares with 6,337 tons in January, 1956. This improvement reflects to a considerable degree the increase in rated primary capacity, which now stands at approximately 82,500 tons against 75,000 tons at the beginning of 1956. This increase in capacity enabled the industry to achieve a total 1956 output of 68,347 tons, despite a strike in mid-year which cost about 5,000 tons production. The 1955 output totalled 61,130 tons.

MOLYBDENUM SETS HOT PACE

There is a high probability of large industrial demand for molybdenum for an indefinite period, states the president, Mr. Arthur Bunker, in the annual report of Climax Molybdenum Co. Last year was the first since 1949 that all Climax sales were to industrial customers. From 1950-55 inclusive, a substantial portion of output was sold to the U.S. Government.

Despite the month-long steel strike in the U.S. and disruptions caused by closure of the Suez Canal, industrial consumption of molybdenum continued to increase in 1955. U.S. consumption was 19,500 s.tons against 18,500 s.tons in 1955, while the remainder of the Free World consumed 11,500 s.tons last year against 9,500 s.tons in 1955.

Climax Molybdenum treated 9,930,000 tons of ore in 1956. On February 4, 1957, its mine in Old Bartlett Mountain, Colorado, produced what its officials claimed to be its one hundredth millionth ton of ore.

Molybdenum's prospects are particularly encouraging in the high temperature field. It has just been announced that research sponsored by the U.S. Office of Naval Research has resulted in the development of molybdenum-base alloys with higher useful strength at temperatures over 1,600 deg. F. than any other known materials. Various coatings have been developed for protection of molybdenum against oxidation. A useful line of several hundred hours at temperatures up to at least 2,000 deg. F. appears possible under certain conditions.

BERYLLIUM IN THE U.K.

It has been announced that production of beryllium metal is now being undertaken on more than a laboratory scale in the U.K., where a pilot plant is being operated by Consolidated Zinc. The process used is a thermal one and was devised by Consolidated Zinc at the invitation of the Atomic Energy Authority. The raw material will be beryl from the Rhodesian property of Selection Trust Ltd. In the event of a growing demand for beryllium for atomic energy purposes, as seems probable, a larger unit could be constructed.

FERRO-ALLOYS IN BRAZIL

The State-owned Companhia Siderurgica Nacional, of Volta Redonda, is installing metallurgical plant at Lafaiete, in the iron and manganese ore region of Minas Gerais, to produce 11,000 tons of ferro-alloys annually at the start. The main production lines will be ferro-manganese and silicon. The equipment has been ordered from Elektro Kemish, of Norway, and includes two three-phase 4,800 kVa furnaces and one of 2,500 kVa.

Electroquimica Brasileira, now owned by Aluminium Limited of Canada, has purchased from Elektro Kemish an Elkem furnace and three transformers, with a combined capacity of 8,100 kVa. The company will produce 8,000 tons of alloys annually, including ferro-silicon, manganese, spiegeleisen and ferro-chrome.

Prometal Produtos Metalicos, de Sao Paulo, has built a new factory and will manufacture *sur-affiné* alloys, such as

ferro-manganese, metallic manganese, chrome, ferro-titanium, ferro-tungsten, etc. Only national raw materials and refractories will be used.

NORWEGIAN ILMENITE

The large deposits of ilmenite found last year near Jossingfjord, in Western Norway, are reported to be even more extensive than was originally thought. They are now estimated at about 350,000,000 tons, of which 166,000,000 tons have already been mapped. Titania A/S, a subsidiary of American Lead Co., which was responsible for the discovery, has been given a concession by the Norwegian government to exploit the deposits. A condition of the concession is that Titania shall spend some 75,000,000 crowns on plant and equipment. At present Titania produces 180,000 tons of ilmenite concentrates a year. As the Jossingfjord deposits are developed, output is to be raised first to 300,000 and then to 400,000 tons annually.

TURKISH CHROME RESTRICTIONS

It is reported from Ankara that the Turkish government may shortly rescind a decree allowing exporters of low-content chrome ores to use part of their foreign exchange earnings to pay for imports. Chrome exporters are alleged to have resold their freely convertible foreign exchange to Turkish importers at inflated prices. This, in turn, led to dearer quotations on the Turkish foreign exchange market.

NEW FREEPORT REFINERY

Freeport Sulphur Co. has announced its intention to build a large nickel and cobalt refining plant near Braithwaite, La., 10 miles south-east of New Orleans. The plant will refine nickel and cobalt ore concentrates mined and processed at the new facility to be constructed at Moa Bay, on the north-east coast of Cuba, as previously announced. The planned capacity of the Louisiana refinery will be 25,000 s.tons of nickel metal and 2,200 s.tons of cobalt metal annually. The combined cost of the Louisiana and Cuban facilities is estimated at $100,000,000. The Louisiana plant is expected to quadruple the current U.S. production of nickel, which last year amounted to about 6,350 s.tons. Current U.S. cobalt output is estimated at 1,625 s.tons.

QUICKSILVER MARKET FIRMER

The London market has continued to exhibit a somewhat firmer tone with the ex-warehouse price at £86 per flask. Meanwhile, it is reported from Washington that the government buying programme for Mexican and the U.S. quicksilver is to be continued until the end of 1958. The original programme, due to expire at the end of this year, provided for the purchase of 200,000 flasks while the extension of the programme is to permit the acquisition of up to 50,000 flasks. It is not clear whether this means 50,000 flasks in addition to the original programme, or 50,000 between now and the end of 1958. In either event, however, the floor price at which the U.S. government is prepared to buy remains at $225 a flask which is below the present London price, so that with the general tightening of the world market there appears no immediate likelihood of any further metal being acquired under this programme.

COPPER · TIN · LEAD · ZINC

(From Our London Metal Exchange Correspondent)

In general, markets have tended to mark time whilst waiting to hear the terms of the U.K. Budget. On Wednesday, copper was weak due to the lack of incentives granted to industry in the Budget. Activity has been at a lower level than recently and it is not expected that this will alter until after the Easter holidays, when it is hoped that there will be an upsurge of industrial buying throughout the world to replenish stocks.

LABOUR TROUBLES FIRM COPPER

The undertone of the copper market has again been firmer, actual prices being higher, and although it is true that this movement is still being supported to a certain extent by sentiment, some increasing interest on the part of industry has been noticed and the labour troubles have also been a contributing factor.

Apart from the strikes reported last week there have been two further short-lived walk-outs in the Rhodesian Copperbelt and a four-day "wild cat" strike at the Hayden smelter in Arizona; but at the time of writing the only strike still on is the most important one, at El Teniente, from whence it is reported that negotiations have broken down. The possibility of a strike at Noranda has been averted and it is hoped that the labour picture on the North American continent will remain favourable throughout the rest of this year.

On the Rhodesian Copperbelt there appears to be unrest both among the European employees and also amongst the natives, most of the recent short-lived strikes being of Europeans, whilst as reported before, a state of dispute has already been registered with the Chamber of Mines by the native unions. All this may mean that production in Rhodesia will suffer later in the year, although it is sincerely to be hoped that good sense and responsible negotiations will avert any serious position developing.

On the London Metal Exchange the contango has continued and stocks at the beginning of the week were 200 tons higher at 3,992 tons; there appears to have been a limited amount of new business, whilst those with open commitments falling due have in most cases prolonged their existing positions. There were signs that Continental operators were active for one or two days during the period under review.

In the United States the producers have maintained their quotation at 32 c. per lb. and on some days have reported satisfactory businesss: Custom smelters have reported business as high as 32 c. per lb. but with the lack of any follow through by consumers, metal is now freely available at 31½ c. per lb. with only limited business taking place. The export market is extremely quiet with some metal probably being available at a shade over 30½ c. per lb. Katanga have restored the price cut made in the middle of March and their quotation is now back at 29.85 c. per lb. parity New York.

RUMOURS OF BUFFER STOCK BUYING IN SINGAPORE

The tin market in London has once again been active and on some days in New York a reasonable demand was reported. U.K. stocks at the beginning of the week were again lower by 10 tons at 549 tons, but the backwardation has remained unaltered owing to slightly freer offerings of the cash metal. At the end of last week there were rumours that there was a strong buyer in Singapore and that this might be the manager of the tin buffer stock but it is hard to believe this, more especially as the turnover did not increase. Nevertheless, it has served to remind people of the clause in the agreement which permits the manager to: "Buy or sell either cash or forward tin on any other established market for tin," at any time that he is able to deal on the London Metal Exchange. On Thursday morning the Eastern price was equivalent to £786¼ per ton c.i.f. Europe.

There have also been rumours of impending labour trouble in Nigeria but at the moment there is no confirmation. However, should there be an interruption of supplies from this source it is to be expected that there would be an immediate reaction in London and if the stoppage was of any duration, an appreciable price movement. In February, Indonesia exported 1,702 l.tons of tin in ore, against 2,092 tons in January. The publication of the March figure will now be awaited with much interest, to see whether the political troubles in that country are beginning to have an effect on the export of ore; all shipments are being made to Holland at the moment, and any lessening of the tonnage should not have any marked effect on the London market, as for the time being at least Continental demand is tending to lag behind output.

U.S. LEAD/ZINC STOCKS RISING

Once more, lead and zinc have been featureless with the exception of a further increase in the backwardation in the zinc market. Producers' agents, merchants and dealers report only routine business in Europe, whilst in America, figures still show that stocks of both metals outside the stockpile are gradually increasing. For zinc the U.S. March production amounted to 96,715 s.tons (88,078 in February), whilst shipments amounted to 94,263 s.tons (80,163 in February); March end stocks were reported approximately 2,500 s.tons higher at 89,341 s.tons.

Another indication of the falling off in demand for zinc was given in the American Iron and Steel Institute's figures, showing the shipments of galvanized sheets as being 205,048 s.tons in February, against 235,902 tons in January, the smallest, in fact, for any month since February, 1955.

Closing prices and turnovers are given in the table overleaf.

LONDON METAL AND ORE PRICES, APRIL 11, 1957

THE WEEK ON THE L.M.E

	April 4 Buyers	April 4 Sellers	April 11 Buyers	April 11 Sellers
COPPER				
Cash	£244	£244½	£241½	£241½
Three months	£244½	£244¾	£242	£242¼
Settlement	£244½		£241½	
Week's turnover	7,750 tons		6,650 tons	
LEAD				
Current ½ month	£112¾	£113	£112¾	£113
Three months	£112	£112½	£112½	£112½
Week's turnover	3,350 tons		2,200 tons	
TIN				
Cash	£772	£774	£769	£771
Three months	£763	£764	£766	£767
Settlement	£774		£771	
Week's turnover	620 tons		920 tons	
ZINC				
Current ½ month	£98¼	£98¾	£98½	£91¾
Three months	£95	£95¼	£94½	£94¾
Week's turnover	6,500 tons		5,075 tons	

METAL PRICES

Aluminium, 99.5%, £197 per ton

Antimony —
English (99%) delivered, 10 cwt. and over £210 per ton
Crude (70%) £200 per ton
Ore (60%) bases 23s. 6d./24s. 6d. nom. per unit, c.i.f.

Arsenic, £400 per ton

Bismuth (min. 1 ton lots) 16s. lb. nom.

Cadmium 12s. 0d. lb.

Cerium (99% nett), £13 18s. lb. delivered U.K.

Chromium, 7s. 2d. lb.

Cobalt, 16s.-19s. lb.

Germanium, 99.99%, Ge. kilo lots 3s. 4d. per gram

Gold, 250s. 3½d.

Iridium, £27/29 oz. nom.

Lanthanum (98/99%) 15s. per gram

Manganese Metal (96%-98%) £310

Magnesium, 2s. 5½d. lb.

Nickel, 99.5% (home trade) £600 per ton

Osmium, £20/22 oz. nom.

Osmiridium, nom.

Palladium, £8 0s./£8 10s. oz.

Platinum U.K. and Empire Refined £33/£33½ oz
Imported £33½/£33¾ nom.

Quicksilver, £86 ex-warehouse

Rhodium, £42 oz.

Ruthenium, £15/£17 oz. nom.

Selenium, 85s. nom. per lb.

Silver, 79¾d. f. oz. spot and 79½ f'd.

Tellurium, 15s./16s. lb.

ORES AND OXIDES

Bismuth	30% 5s. 0d. lb. c.i.f. 18/20% 1s. 3d. lb. c.i.f.
Chrome Ore—	
Rhodesian Metallurgical (semifriable) 48%	£17 8s. 0d. per ton c.i.f.
,, Hard Lumpy (45%)	£17 8s. 0d. per ton c.i.f.
,, Refractory 40%	£12 15s. 0d. per ton c.i.f.
,, Smalls 42%	£16 5s. 0d. per ton c.i.f.
Baluchistan	£18 15s. 0d. per ton c.i.f.
Columbite, 65% combined oxides, high grade	185s./197s. 6d. per unit
Fluorspar—	
Acid Grade, Flotated Material	£22 13s. 3d. per ton ex. works
Metallurgical (75/80% CaF_2)	156s. 0d. ex. works
Lithium Ore—	
Petalite min. 3½% Li_2O	£8-£10 per ton f.o.b. Beira
Lepidolite min. 3½% Li_2O	£8-£10 per ton f.o.b. Beira
Amblygonite basis 7% Li_2O	£28-£32 per ton f.o.b. Beira
Magnesite, ground calcined	£28 0s./£30 0s. d/d
Magnesite Raw (ground)	£21 0s./£22 0s. d/d
Molybdenite (85% basis)	8s. 5d. nom. per lb. (f.o.b.)
Titanium Ore —	
Rutile 95/97% TiO_2	£64/£65 per ton c.i.f. Aust'n
Ilmenite 52/54% TiO_2	£11 per ton c.i.f. Malayan
Wolfram and Scheelite (65%)	157s. 6d./165s. 0d. per unit c.i.f.
Manganese Ore Indian	
Europe (46%-48%) basis 165s. freight plus 17½% surcharge	145d. per unit c.i.f.
Manganese Ore (43%-45%)	116d. per unit. c.i.f.
Manganese Ore (38%-40%)	111d. per unit. (including duty)
Vanadium —	
Fused oxide 90-95% V_2O_5	£12½-£13½ per unit c.i.f.
Zircon Sand (Australian) (65-66% ZrO_2)	£20 per ton c.i.f.

LONDON STOCK EXCHANGE PRICES, APRIL 10, 1957

Finance	Price Apr. 10	+ or — on week
African & European	53/1½	—1/10½
Anglo American Corpn.	6¾	—⅛
Anglo-French	21/6	+3d
Anglo-Transvaal Cons.	26/3	.....
Central Mining (£1 shrs)	61/6	+5/6
Consolidated G'fields	58/6	+2/6
Consol. Mines Selection	28/-	+3d
East Rand Consols	1/4½	.....
General Mining	60/7½	—1/10½
H. E. Prop.	8/-	.....
Johnnies	39/9	.....
Rand Mines	63/9	.....
Rand Selection	35/-	+7½d
Union Corporation	36/-	+1/-
Vereeniging Estates	5 1/16	.....
Wits	36/9	+2/-
West Wits.	31/9	—9d
Rand Gold		
Blyvoors	19/-	—6d
Brakpan	5/3	—1½d
Buffelsfontein	30/9	—10½d
City Deep	12/6	+1½d
Consol. Main Reef	12/1½	.....
Crown	26/-	—3d
Daggas	30/3	.....
Dominion Reefs	17/6	.....
Doornfontein	20/3	—6d
Durban Deep	21/-	—1½d
E. Champs	2/7½	—1½d
E. Daggas	7/10½	+1½d
E. Geduld (4s. units)	26/9	—6d
E. Rand Props.	41/3	.....
Geduld	68/9	.....
Govt. Areas	4/3	+1/-
Grootvlei	15/10½	—6d
Hartebeestfontein	46/7½	—9d
Libanon	6/3	.....
Luipaards Vlei	12/10½	—4½d
Marievale	16/10½	+3d
New Kleinfontein	4/1½	+10½d
New Pioneer	18/9	.....
Randfontein	29/9	—9d
Robinson Deep	6/6	.....
Rose Deep	8/-	.....
Simmer & Jack	3/7½	.....
S.A. Lands	21/-	+6d
Springs	2/-	.....
Stilfontein	25/3	—4½d
Sub Nigel	17/1½	.....
Vaal Reefs	30/6	—3d
Van Dyk	2/9	—1½d
Venterspost	11/9	—3d
Vlakfontein	14/-	—3d
Vogelstruisbult	12/6	.....
West Driefontein	4½	—⅛

Rand Gold contd.	Price Apr. 10	+ or — on week
W. Rand Consolidated	29/4½	—7½d
Western Reefs	27/1½	.....
O.F.S. Gold		
Freddies	4/9	—6d
Freddies Consolidated	2/7½	—4½d
F.S. Geduld	61/10½	—2/6
Geoffries	2/9	—1½d
Harmony	19/9	—9d
Loraine	3/10½	+1½d
Lydenburg Estates	11/3	—1/-
Merriespruit	3/9	—4½d
Midale Wits	7/6	—6d
Ofsits	47/6	—2/-
President Brand	48/1½	—7½d
President Steyn	26/6	+6d
St. Helena	23/6	—9d
Virginia Ord.	9/9	+4½d
Welkom	12/9	—6d
Western Holdings	61/10½	—2/6
West African Gold		
Amalgamated Banket	1/3	.....
Ariston	4/4½	+1½d
Ashanti	18/6	+1/6
Bibiani	2/4½	+3d
Bremang	1/4½	.....
Ghana M.R.	1/7½	.....
Konongo	1/4½	—0½d
Marlu	½d	.....
Taquah	1/-	.....
Western Selection	5/7½	—1½d
Australian Gold		
Gold Mines of Kalgoorlie	13/-	.....
Great Boulder Prop.	12/9XD	+4½d
Lake View & Star	19/7½	+1/1½
Mount Morgan	14/3	.....
North Kalgurli	7/10½	+10½d
Sons of Gwalia	1/9	.....
Western Mining	9/6	—3d
Miscellaneous Gold		
Cam & Motor	7/9	+1½d
Champion Reef	14/9	.....
Falcon Mines	7/6	+1½d
Globe & Phoenix	23/6	+1/-
Motapa	10½d	.....
Mysore	3/9	.....
Nundydroog	20/3	.....
St. John d'el Rey	58/9	+8/9
Zams	55/-	+5/-

Diamonds and Platinum	Price Apr. 10	+ or — on week
Anglo American Inv.	8½	—½
Casts.	27/4½	+2/7½
Cons. Diam. Pref. of S.W.A.	10/10½	+1½d
De Beers Defd. Regd.	4½	.....
De Beers Pfd. Regd.	13½	.....
Pots. Platinum	14/10½	+3d
Waterval	24/6	+3d
Copper		
Bancroft	40/7½	—4½d
Chartered	74/6	+2/3
Esperanza	2/3	—4½d
Magundi	9/-	—3d
Messina	8 1/16	—⅛
Nchanga	12⅛	+⅛
Rhod. Anglo-American	4 3/16	+⅛
Rhod. Katanga	36/6	—9d
Rhodesian Selection	22/9	+3d
Rhokana	39⅜	+1⅛
Rio Tinto	4 1/16	+⅛
Roan Antelope	13/3	+7½d
Selection Trust	5	+⅛
Tanks	8 1/16 XD	+⅛
Tharsis Sulphur Br.	4¼	+¼
Tin (Eastern)		
Ayer Hitam	27/-	+1/-
Gopeng	16/1½	+9d
Hongkong	7/4½	+6d
Ipoh	17/9	.....
Kamunting	11/-	+6d
Kepong Dredging	5/6	+3d
Kinta Tin Mines	25/3	+2/3
Malayan Dredging	15/7½	+9d
Pahang	15/4½ XD	+1/3
Pengkalen	18/6	+9d
Petaling	6/10½	+7½d
Rambutan	20/-	+1/3
Siamese Tin	13/7½	+1½d
Southern Kinta	19/4½	+1/4½
S. Malayan	10/7½	+4½d
S. Tronoh	8/4½	+1/-
Sungei Kinta	22/3	+1/-
Tekka Taiping	9/-	+3d
Tronoh	13/7½	+9d
Tin (Nigerian and Miscellaneous)		
Amalgamated Tin	10/1½	+1/1½
Beralt Tin	49/9	+6/-
Bisichi	4/6	+3d
British Tin Inv.	25/9	+3d
Ex-Lands Nigeria	2/6	+1½d
Geevor Tin	20/7½	—3d

Tin (Nigerian and Miscellaneous) contd.	Price Apr. 10	+ or — on week
Gold & Base Metal	1/3	+3d
Jantar Nigeria	3/9	+4½d
Jos Tin Area	15/-	.....
Kaduna Prospectors	2/-	.....
Kaduna Syndicate	2/1½	.....
London Tin	11/10½	+3d
United Tin	10½d	—1½d
Silver, Lead, Zinc		
Broken Hill South	77/6	+1/3
Burma Mines	3/6	.....
Consol. Zinc	88/6	—9d
Lake George	10/6	+3d
Mount Isa	30/3	—3d
New Broken Hill	58/-	+3/3
North Broken Hill	6	.....
Rhodesian Broken Hill	12/-	—6d
San Francisco Mines	29/-	+2/6
Uruwira	3/9	—3d
Miscellaneous		
Base Metals and Coal		
Amal. Collieries of S.A.	2 1/16	.....
Associated Manganese	38/3	+2/-
Cape Asbestos	11/4½	+10½d
C.P. Manganese	28/9	+3/-
Consol. Murchison	48/9	—1/3
Natal Navigation	3½	+⅛
Turner & Newall	128/3	+8/-
Wankie	18/9	—9d
Witbank Colliery	5¼	+¼
Canadian Mines		
Dome	$25¾	.....
Hollinger	$54½	+3¾
Hudson Bay Mining	$171	+5
International Nickel	$209	+5½
Mining Corpn. of Canada	£7	+⅛
Noranda	$107	+8
Quemont	£6½	+¼
Yukon	4/7½	.....
Oil		
Apex	49/3	+4/6
Attock	39/-	+1/3
British Petroleum	149/-	—3/-
Burmah	106/3	+1/6
Canadian Eagle	71/-	+3d
Mexican Eagle	21/9	—1½d
Shell	178/9	—1/9
T.P.D.	80/-	+13/-
Ultramar	75/6	+1/-

Mining Finance

B.O.M.A. Triumphs—At Last

For many long and weary years—indeed, since its very formation in 1946—the British Overseas Mining Association has been campaigning indefatigably on behalf of the many mining companies controlled in London but operating overseas. It has been a hard row to hoe. At first, BOMA's very real case was regarded as just so much lobbying and special pleading. Memoranda on the position of U.K. undertakings operating abroad were sent to successive Chancellors, but to no avail. But the fight was kept going and now this week, with Mr. Peter Thorneycroft's first budget, BOMA could proudly say "At last!"

Until now—and it has taken a succession of foreign take-over bids and the trek of London registrations abroad to shake the Treasury out of its complacency in the matter—the position has been that a U.K.-controlled mining company, deriving all or the bulk of its profits from abroad, had been, with only minor variations, subject to the normal U.K. tax laws as modified by double taxation relief arrangements where applicable. There have been two main, unanswerable criticisms of this situation. In the first place, such an extractive and speculative industry as metal mining demands, as of equity, a taxation treatment quite apart from that which might be deemed reasonable for other industries. Other countries, for years past, have already shown their appreciation of this fact in their taxation policies towards their mining industries. This leads to the second point, which is that through this differential tax treatment, London has been losing company after company through emigration and foreign bids have been encouraged. Now, the Chancellor, following the recommendations of the Royal Commission, has agreed that U.K. companies qualifying thus as "overseas trading corporations" will be exempted from U.K. income tax and profits tax on trading profits earned abroad. Of course, payments out of these profits by way of dividends or otherwise will be subject to U.K. income tax and, if received by a U.K. company, to profits tax also.

All this represents a huge step forward and in due course might well do much to restore some of London's lost prestige in the world of mining. This week's more immediate questions have been concerned with which companies are likely to benefit most. Most mine managements are awaiting the text of the Finance Bill before wanting to commit themselves about their future tax position. But already some "certainties" for big tax savings can be sorted out.

Australian and West African gold mines operating overseas, but controlled in London, come readily to mind. In this category, fall Lake View and Star which, together with North Kalgurli (1912) have appeals outstanding with the Treasury for permission to emigrate to Australia. In the Commonwealth, gold mining profits are not taxable and thus the big tax bill which Lake View has been meeting in the past has been wholly on account of payments in the U.K. In the year to June, 1956, profits amounted to £462,000 of which U.K. tax took as much as £244,000. It would now appear that the whole of this amount will be saved other than what is required to be deducted from dividends at 8s. 6d. in the £. In the circumstances, it may well be that no point any longer exists for either Lake View or N. Kalgurli wishing to move to the Commonwealth as so many other Australian mining companies have already done.

Ashanti appears to be the outstanding beneficiary among the West African mines, notably in respect of the saving in respect of profits tax alone which, in the last accounts amounted to £132,000 out of profits of £616,000. Ashanti's output this year will be running near to record levels and on the chairman's recent forecast gross profits for this year may be of the order of £1,300,000. There is clearly room for a sizeable advance in Ashanti's dividend—perhaps to as much as 50 per cent. for the current year.

Tin shares, many of which are controlled in London but have their scene of operations either in the Far East or in Nigeria, should benefit substantially from the Chancellor's new concessions. Beralt, the tin wolfram producer in Portugal, looks to be particularly well placed in this respect. Most of the Malayans, such as Southern Kinta, the big multi-dredge operation, will come out well and this applies, too, to the Nigerians where Amalgamated Tin Mines of Nigeria will, perhaps, derive most benefit. Relatively, lesser companies with smaller capitals may not be far behind and this fact may not yet have been fully appreciated. Siamese Tin looks interesting, since out of profits of £491,000 last year no less than £290,000 was paid in U.K. tax. The company appears to pay no local tax other than the export duty which presumably has not been allowed as a tax cost in this country. (This also applies to Beralt.)

New Consolidated Zinc, controlled here and operating in New South Wales, looks to be well placed in this context, but there is some uncertainty for the moment about the position of the bigger and associated company, Consolidated Zinc. The latter's profits are to a considerable extent derived from its own mining operations in Australia but appreciable earnings also emerge from the U.K. through such subsidiaries as Imperial Smelting. Clearly, Consolidated Zinc will be better off in the tax picture but to what extent is hard to say. In any case, the company has considerable financial needs in connection with its expansion and exploration programmes.

The big remaining doubt, at least until the Finance Bill is published, concerns the position of mining finance houses which are controlled from London. Into this category fall such as Union Corporation, Central Mining, Consolidated Gold Fields, British South Africa Co. and Rio Tinto and Western Selection. It would be foolhardy at this point to take a dogmatic view of what the position of such companies will be though the chance that certain benefits will accrue under the new tax code certainly appears a very real one.

RIO TINTO'S CAUTIOUS POLICY

The Rio Tinto Company has been repeatedly hitting the mining headlines with the group's bold new search for minerals all over the world. Uranium in Canada and Australia, vast prospecting in Africa, and so on have all combined to give this old-established London company a new glamour in the modern mining world. But for the present, the company's well-being continues to be substantially identified with the fortunes of the Northern Rhodesian Copperbelt through the big investments held in Rhokana Corporation, Nchanga and Mufulira. This fact has again been emphasised by the preliminary profits statement disclosing that in the year to December, 1956, last net income advanced to £3,387,000 against £2,513,000 in 1955, the net profit being £1,470,000, against £1,124,000. The year's Ordinary dividend has been merely repeated at 15 per cent although on this occasion it has been payable on a capital increased to £5,100,000 by a one-for-five rights issue at 50s. last year.

Allowing for the time-lag involved, the advance of around 30 per cent in the past year's income coincides almost exactly with the extent of the increase in dividend payments by the Rhodesian copper producers in which the company is a large holder. Other things being equal, some decline in earnings during the current year is a certain expectation bearing in mind the setback in the copper price in recent months and the consequent effect this is likely to have on producers' distributions. Since Rio Tinto 10s. shares at 96s. 3d. give only a modest yield they superficially appear sufficiently valued. This would be to ignore the vast potential of the group's uranium programmes in Canada and Australia which from now on during the next year or two, will be reaching fruition. No income to Tinto in London can be expected to accrue for a year or two. Thereafter, with uranium evidently going to remain in demand, revenue might be receiving a considerable boost from this quarter. Might it be asked, incidentally, if the company should not now consider falling into line with normal practice with the distribution of half - yearly interim dividends in place of the single end-year payment hitherto forthcoming?

FIRST QUARTER'S DIAMOND SALES

Probably not too much significance should be placed on the decline in diamond sales during the first quarter of

the current year which has been reported by the Central Selling Organisation through De Beers Consolidated Mines. Total turnover in stones amounted to £17,742,000 during the March quarter which compares with £19,686,000 in the preceding months. On the other hand, the latest figure is well up on the £16,817,000 reported in respect of the first three months of 1956.

It is almost certainly still the situation in the rough diamond trade that the limiting factor in turnover is the volume of production available for offer. The past quarter's figures will have been helped by the increase in the prices of both gem and industrial stones as from the first week in January and the fact that despite this, total money turnover was lower than in the previous three months strongly suggests that the big demand, notably for gems, in the closing months of last year, left stocks available for disposal at a particularly low level.

The past quarter's gem turnover at £10,972,000, against £13,742,000 in the final three months of 1956, was the lowest since the December quarter of 1954. On the other hand, business in industrials improved to £6,770,000 against £5,944,000 in the closing three months of 1956. Gem sales under present conditions may reasonably be expected to hold up in so far as production permits. The recent improvement in Industrials, coming at a time when U.S. stockpiling purchases have been running to a close, comes as a welcome surprise. It will be remembered that Sir Ernest Oppenheimer at last year's De Beers meeting warned of the necessity for producers to undertake research in order to find additional outlets for the use of industrial diamonds as and when U.S. stockpiling purchases came to an end.

NORTH RANKIN TO START PRODUCING

The North Rankin Nickel Mines announced that it would start production from its 250-ton mill on April 30. The company's mine and mill are situated at Rankin Inlet on the west side of Hudson Bay. When in operation, the company will be Canada's fifth and smallest nickel producer, as well as the most northerly. The expected production of 6,000 - 10,000 tons of concentrates this season has been sold overseas at premium prices.

MOUNT ISA'S NEW AREAS

In addition to a large exploratory campaign which is revealing substantial tonnages of lead, zinc and copper ore on its own leases, Mount Isa Mines has taken up extensive areas under "Authorities to Prospect" in other parts of Queensland. Under this scheme, country has been secured at Gladstone and Bundaberg and other areas situated to the north-west of Mount Isa close to the Northern Territory border. The total area concerned amounts to 9,020 square miles, and the project will employ some 300 men. Although copper will be the mineral most eagerly sought after, all other minerals will be prospected.

Early in the century numerous small copper occurrences were explored and worked in both the Gladstone and Bundaberg districts. Some of these attained the stage of concentrating and smelting, but all were short-lived. Mount Isa's planned programme should reveal the possibilities of known occurrences at depth, and also prospects of concealed orebodies in the neighbouring country. As in other parts of the world, the future of Australian metal mining rests with the large organisations which have both the capital and trained technical staff to undertake the large-scale work involved.

DIFFICULTIES AT TABLELAND TIN

Tableland Tin Dredging Company situated in North Queensland is Australia's largest tin producer. The company was formed with the expectation of a production rate at about 60 tons of tin oxide concentrate per month, but recent returns have been much below that figure. This has been due to difficulties in working brought about by relatively high grade ground being separated by areas of cemented wash which, although tin-bearing, does not readily disintegrate on treatment. It is expected, however, that hydro-electric power from an east coast station will become available to the company during 1957, and this will bring about a substantial reduction in costs.

Financial News and Results

Alcan is to Raise $125,000,000.—In order to repay outstanding bank debts, and to provide for working funds and capital expenditure, the Aluminium Company of Canada (principal subsidiary of Aluminium Ltd.) intends to raise $125,000,000 by way of debentures, the principal and interest of which will be payable in U.S. dollars. The company is negotiating for the sale of these debentures to a group of underwriters in the U.S. headed by the First Boston Corporation and Morgan Stanley and Co. for an offering to the public about the middle of April.

S. Africa Uranium Exports.—A preliminary estimate shows the value of South African exports of uranium and thorium in January at £3,268,721 against £2,936,545 in January, 1956.

A SENIOR MINING ENGINEER

aged 30—40, required for a new alluvial mining project in West Africa. Candidates should hold a Degree or Diploma in Mining, and have had several years' experience in the field of alluvial mining operations. Duties would comprise supervision of milling operations. Salary in the range £1,600/£2,000 per annum; 15 months' tours followed by three months' home leaves; free furnished accommodation; first-class passages and free medical services; contributory pension scheme; free life assurance.

Applications, which will be treated in strict confidence, should contain full personal details and also qualifications and experience, quoting reference S.4—Write Box 596, The Mining Journal Ltd., 15 Wilson Street, Moorgate, London, E.C.2.

Publications Received

Colonial Geology and Mineral Resources, Vol. 6, No. 3, a quarterly bulletin of the Colonial Geological Surveys, is obtainable at 7s. 6d. net from H.M.S.O. The issue to hand contains interesting and well-illustrated articles on Geological Reconnaissance of Parts of the Central Islands of the British Solomon Islands Protectorate, and on Water Supply Problems in Arid Regions in the British Colonies and Southern Africa. Reports of geological surveys in Kenya, Nyasaland, Bechuanaland, Nigeria, Borneo and the Solomons are included. Notes of interest and book reviews, maps, a personalia section and mineral and metal statistics complete a worthy edition.

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The 1955 Report of the Sierra Leone Mines Department lately has been received. The Report costs 1s. and bears the signature of F. R. H. Green, chief inspector of mines.

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The Index of Technical Articles takes the form of a monthly index of articles appearing in the latest issues of scientific, industrial, technical and trade journals published in Great Britain. Each entry consists of the title and author of the article, the name, volume, number and date of the periodical in which it appears and where the title of the article is not self-explanatory, a brief sub-title is added. Each issue includes an alphabetical index of titles and authors. Issue No. 1, February, 1957, is to hand, containing data of periodicals received in January, 1957. *The Index* is published by Iota Services Ltd., London.

*

Bulletin No. 12 of the Geological Survey of Great Britain is published by the Department of Scientific and Industrial Research and contains articles of marked interest on a variety of geological subjects located in the home islands. The work, well illustrated, costs 8s. 6d. net from H.M.S.O.

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Extraction and Refining of the Rarer Metals, published by The Institution of of Mining and Metallurgy at 60s., comprises twenty-two papers and the discussions arising therefrom as the proceedings of a symposium arranged by the Institution and held in London on March 22-23, 1956. The papers cover a wide range under the general subject. The work, of definite value, is 444 pages with index and illustrations and thus does not lend itself to more detailed review. It is available from the Institution at 44 Portland Place, London, W.1.

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Mobil Oil Company announces the publication of its latest booklet in the Mobil Technical Series. It is entitled *Pneumatic Tool Lubrication* and is intended to complete and also be complementary to the story in *Air Compressor Lubrication*, also in the Mobil Technical Series. Many important manufacturers of pneumatic equipment have assisted in the preparation of this publication by the supply of illustrations. The booklet is available on application to Mobil Oil Company, Caxton House, Westminster, S.W.1, or from any of the Company's Industrial Divisional Offices.

ANGLO AMERICAN CORPORATION OF SOUTH AFRICA, LIMITED

(Incorporated in the Union of South Africa)

MINING COMPANIES' REPORTS (abridged) for the year ended 31st December, 1956

(All Companies mentioned are incorporated in the Union of South Africa)

SPRINGS MINES, LIMITED

CAPITAL : Authorised and Issued—£2,527,500 in 10,110,000 Shares of 5s. each, fully paid.

Tons milled .... **1,513,000.** Yield (per ton, **2.40** dwts.) .... **182,035** oz.

Income and Expenditure Account	£	Appropriation Account	£
Revenue (per ton milled 30/3.1)	2,289,314	Taxation :—	
Working Costs after transferring £12,500 to working costs reserve (per ton milled 28/7.3)	2,164,285	Union Government Income Tax	3,282
		Provincial Tax	656
Working Profit (per ton milled 1/7.8)	125,029	Government's share of Profits under Mining Lease	11,467
Sundry Revenue, less Expenditure	20,667	Dividend No. 67 of 2½d. per share	94,781
		Dividend No. 68 of 3d. per share	126,375
Total Profit	145,696	Directors' Special Remuneration	7,500
Add—		Balance unappropriated at 31st December, 1956	401,084
Balance to credit of Appropriation Account at 31st December, 1955	435,223		
Decrease in terminal liability under Silicosis Act, 1946	3,023		
Funds previously appropriated for capital expenditure now written back	61,203		
	£645,145		£645,145

ORE RESERVE (based on pay limit of **3.4** dwt.) (1955—**3.4** dwt.) :

As at end of	Tons	Stope Width (inches)	Stope Value (dwts.)	Inch.dwt.
1955	2,346,700	44.20	4.78	211
1956	2,176,000	43.89	4.56	200

During the year the value of the ore mined from the reserve was **4.76** dwt., which is **0.02** dwt. lower than the value of the reserve at the end of 1955.

DEVELOPMENT :—

Footage Advanced	Footage Sampled	Percentage Payable	Average reef width (inches)	Average assay value (dwt.)	Inch-dwt.
17,407	14,770	21.50	14.94	24.73	369

EXTRACT FROM THE CHAIRMAN'S REVIEW—The working profit for the year showed an increase of **£3,940** on the previous year's figure. This is accounted for largely by the reduction in working costs equivalent to **2s. 1.5d.** per ton. That this drop in working costs at your company's mine took place during a time when the general level of working costs continued to rise throughout the industry is due mainly to the fact that a greater proportion of the mill tonnage was drawn from surface dumps, and also to the contraction of the development programme. It is also a reflection of the close attention paid by the management to economy and efficiency in all phases of the mine's operations.

With its small margin of working profit the mine is highly vulnerable to any drop in revenue or rise in working costs.

The tonnage drawn from surface dumps increased to **503,000** tons and made up roughly one-third of the total tonnage milled. A fall of **.19** dwt. per ton in the yield was responsible for a small reduction in total gold production.

The ore reserve at the end of the year, which when compared with the figures at the end of 1955 reflected decreases of **170,700** tons in the payable ore and **.22** dwt. in the value, does not include the payable dump material which is being fed to the mill. There remains an estimated **3,000,000** tons of this material available for treatment.

EAST DAGGAFONTEIN MINES, LIMITED

CAPITAL : Authorised—£2,000,000. Issued—£1,865,000 in 3,730,000 Shares of 10s. each, fully paid.

Tons milled .... **1,140,000.** Yield (per ton, **3.29** dwt.) .... **187,279** oz.

Income and Expenditure Account	£	Appropriation Account	£
Revenue (per ton milled 41/4.0)	2,355,835	Taxation :	
Working Costs (per ton milled 34/2.9)	1,951,664	Union Government Income Tax	151,838
		Provincial Tax	821
Working Profit (per ton milled 7/1.1)	404,171		152,659
Sundry Revenue, less Expenditure	14,849	Increase in terminal liability under Silicosis Act 1946	2,692
		Directors' Special Remuneration	8,000
Total Profit	419,020	Appropriation for Capital Expenditure	4,312
Add—		Dividends :	
Balance to credit of Appropriation Account at 31st December, 1955	274,976	No. 33 of 9d. per share	139,875
		No. 34 of 9d. per share	139,875
		Unappropriated Profit 31st December, 1956	246,583
	£693,996		£693,996

ORE RESERVE (based on pay limit of 3.5 dwt.) (1955—3.3 dwt.) :

As at end of	Tons	Stope Width (inches)	Stope Value (dwt.)	Inch-dwt.
1955	4,206,300	36.75	4.21	155
1956	4,398,000	36.68	4.49	165

The Reserve at the end of 1956 includes ore developed on the Kimberley Reef which totalled **1,421,000** tons averaging **5.66** dwt. over a stoping width of **36.81** inches equivalent to **208** inch-dwt.

During the year under review the value of the ore mined from the reserve was **4.07** dwt., which is **0.14** dwt. lower than the value of the Reserve at the end of 1955.

DEVELOPMENT :—

	Footage Advanced	Footage Sampled	Percentage payable	Average reef width (inches)	Average assay value (dwt.)	Inch-dwt.
Main Reef Leader	9,709	7,785	19.4	9.98	19.64	196
Kimberley Reef..	*24,389	18,050	34.6	6.52	65.41	426

* In addition to the above, **1,762** feet were developed on the Kimberley Reef horizon on Daggafontein Mines Limited ground.

EXTRACT FROM CHAIRMAN'S REVIEW—The chief reason for the fall of **£121,617** in the working profit compared with 1955 was the substantial increase in working costs, following the general trend throughout the gold mining industry. One important factor was that the full effect of the wage increases granted towards the end of 1955 was felt during the year. There were also small decreases in the tonnage milled and the yield per ton, offset to some extent by the slightly higher average gold price obtained during 1956.

The decrease of **6,451** feet developed on the Main Reef Leader accounted for the drop of **6,139** feet in the total footage developed during the year. While greater annual footages may continue to be developed on the Kimberley Reef, the total footage developed in the mine will inevitably decline on account of the diminishing number of unstoped areas. However, the average value of payable ore on the Kimberley Reef again showed appreciable improvement, the percentage payability of the reef sampled increasing from **25.4** to **34.6**, and the average assay value by **11** inch-dwt. to **426** inch-dwt.

THE SOUTH AFRICAN LAND AND EXPLORATION COMPANY, LIMITED

CAPITAL : Authorised—£612,500. Issued—£433,125 in 2,475,000 Shares of 3s. 6d. each, fully paid.

Tons milled .... **1,071,000.** Yield (per ton, **4.25** dwt.) .... **227,484** oz.

Income and Expenditure Account	£	Appropriation Account	£
Revenue (per ton milled 53/4.4)	2,857,937	Taxation :—	
Working Costs after transferring £3,900 to working costs reserve (per ton milled 38/2.4)	2,045,913	Union Government Income Tax	365,583
		Provincial Tax	1,272
Working Profit (per ton milled 15/2.0)	812,024	Adjustment in respect of previous year	86
Sundry Revenue, less Expenditure	24,480		366,941
Total Profit	836,504	Government's Share of Profits under Mining Lease	31
Add—		Dividend No. 36 of 1s. 6d. per share	185,625
Balance to credit of Appropriation Account, 31st December, 1955	268,773	Dividend No. 37 of 1s. 6d. per share	185,625
		Increase in terminal liability under Silicosis Act 1946	5,652
		Directors' Special Remuneration	7,750
		Appropriation for Capital Expenditure	14,135
		Balance unappropriated at 31st December, 1956	339,518
	£1,105,277		£1,105,277

ORE RESERVE (based on pay limit of **3.6** dwts.) (1955—**3.4** dwts.) :

As at end of	Tons	Stope Width (inches)	Stope Value (dwt.)	Inch-dwt.
1955	3,679,000	42.82	5.57	239
1956	3,766,100	42.32	5.83	247

The value of ore mined from reserve in 1956 averaged 5.37 dwt.

DEVELOPMENT :—

Footage Advanced	Footage Sampled	Percentage Payable	Average reef width (inches)	Average assay value (dwt.)	Inch-dwt.
45,479	31,610	32.9	24.72	15.91	393

EXTRACT FROM THE CHAIRMAN'S REVIEW—Although **34,000** tons fewer were milled during the year, the profit rose by **£183,631** compared with 1955. The reason for this increase was the substantial improvement of .42 dwt. per ton in the yield and, in addition, the gold price for the year was slightly higher on average than for the previous year. A larger dividend, 1½d. per share more than in 1955, was declared.

Working costs rose by **1s. 6d.** per ton milled. The main causes of this rise, which was offset to some extent by a small reduction in the total amount of development work carried out, were the wage increases granted at the end of 1955 and the larger pneumoconiosis contributions resulting from the Pneumoconiosis Act, 1956, which came into force on August 1st.

Capital expenditure during the year amounted to **£538,854**, of which **£525,000** was incurred in purchasing the fixed assets of The Withok Proprietary Company, Limited.

The principal asset of the Withok Company is the farm Withok No. 7 and negotiations for prospecting and mining rights within this area are in progress. At the same time the necessary legal and technical arrangements are being made for the extension of development ends into Withok from our present mining property and from Springs Mines Limited. The complete scheme for opening up the area will depend upon the results of this development work.

In order to provide the necessary reserve shares for the financing of the project, the company's authorised capital was increased from **£500,003** to **£612,500**, in **3,500,000** shares of **3s. 6d.** each, at an extraordinary general meeting on 13th December, 1956.

DAGGAFONTEIN MINES, LIMITED

CAPITAL : Authorised—£2,000,000. Issued—£1,750,000 in 7,000,000 Shares of 5s. each, fully paid.

Tons milled .... **2,637,000.** Yield (per ton, **4.51** dwts.) .... **595,135** oz.

Income and Expenditure Account	£
Revenue (per ton milled 56/9.4)	7,487,435
Working Costs (per ton milled 31/2.1)	4,110,465
Working Profit (per ton milled 25/7.3)	3,376,970
Uranium and Sulphuric Acid Profit—subject to adjustment	1,653.063
Total Working Profit	5,030,033
Sundry Revenue, less Expenditure	132,320
	5,162,353
Less: Interest on Uranium Loans	145,528
	5,016,825
Add: Unappropriated Profits at 31st December, 1955	428,815
Transfer from Uranium Reserve	50,000
	£5,495,640

Appropriation Account	£
Taxation :—	
Union Government Income Tax	1,819,655
Provincial Tax	4,830
Adjustments in respect of previous years	16
	1,824,501
Government's share of Profits under Mining Lease	801,383
Dividend No. 47 of 2/9 per share	962,500
Dividend No. 48 of 2/9 per share	962,500
Directors' Special Remuneration	7,500
Appropriations for Capital Expenditure:—	
Expenditure on Fixed Assets	110,631
Redemption of Uranium Loans	417,575
Increase in terminal liability under Silicosis Act, 1946	4,833
Balance unappropriated at 31st December, 1956	404,217
	£5,495,640

ORE RESERVE (based on pay limit of **3.0** dwt.) (1955—**2.9** dwt.) :

Main Reef Leader and Kimberley Reef—Total :

As at end of	Tons	Stope Width (inches)	Stope Value (dwts.)	Inch-dwts.
1955	12,768,000	43.58	5.32	232
1956	11,344,000	43.22	5.32	230

The value of the ore mined from the Reserve in 1956 was **5.40** dwts.

Kimberley Reef (included in previous total) :

As at end of	Tons	Stope Width inches	Gold Value Dwt./ton	Gold Value Inch-dwt.	Uranium Value lb./ton	Uranium Value Inch-lb.
1955	5,095,600	47.04	6.35	299	0.444	20.9
1956	4,587,500	46.90	6.16	289	0.435	20.4

In addition to the foregoing, it is estimated that at the end of 1956 there were approximately **3,000,000** tons of uranium bearing slimes in the Kimberley Reef slimes dam, having an average value of **0.4** lb. uranium oxide per ton.

DEVELOPMENT :—

Gold :

	Footage Advanced	Footage Sampled	Percentage payable	Average reef width (inches)	Average assay value (dwt.)	Inch-dwts.
Main Reef Leader	14,530	12,805	42.5	18.85	20.24	382
Kimberley Reef	17,949	12,880	23.7	23.58	15.51	366

Uranium (Kimberley Reef) :

Average uranium oxide lb. per ton **0.82**

Equivalent inch-lb. **19.38**

URANIUM PRODUCTION :—At the uranium plant **1,494,389** tons of slime were treated and yielded **565,392.5** lb. of uranium. The yield per ton was **0.378** lb. and the residue **0.063** lb.

EXTRACT FROM THE CHAIRMAN'S REVIEW—There was a decrease of **£279,052** in the working profit from gold production for the year compared with 1955. There was also a drop of **£28,975** in the profit from uranium and sulphuric acid production, with the result that the company's total profit was **£308,027** less than the previous year.

The main reason for this substantial decline in profits was the rise in working costs, which were **£128,467** higher than in 1955, equivalent to a rise of **1s. 2d.** per ton milled. The increase in wages granted towards the end of 1955, and larger pneumoconiosis contributions, resulting from the introduction of the 1956 Pneumoconiosis Act, were contributory factors in the overall increase in working costs. The fall in profits was, however, also attributable to the reduction of **21,000** tons in the tonnage milled and to a drop of **0.06** dwt. in the yield compared with the previous year.

Development work during the year was carried on on a reduced scale compared with 1955, the total footage advanced on the Main Reef Leader and Kimberley Reef amounting to **32,479** feet. The figure for the previous year was **47,512** feet. It is expected that the footage developed each year will decline as unstoped sections of the mine become fully developed.

BRAKPAN MINES, LIMITED

CAPITAL : Authorised and Issued—£1,150,000 in 4,600,000 Shares of 5s. each, fully paid.

Tons milled .... **1,284,000.** Yield (per ton, **3.40** dwt.) .... **218,321** oz.

Income and Expenditure Account	£
Revenue (per ton milled 42/9.7)	2,748,369
Working Costs after transferring £350 from working costs reserve (per ton milled 40/2.7)	2,582,546
Working Profit (per ton milled 2/7.0)	165,823
Sundry Revenue less Expenditure	73,483
Total Profit	239,306
Add—	
Balance to credit of Appropriation Account at 31st December, 1955	359,522
Decrease in terminal liability under Silicosis Act 1946	5,991
	£604,819

Appropriation Account	£
Taxation :	
Union Government Income Tax	4,019
Provincial Tax	804
Adjustment in respect of previous years	4,764
	9,587
Government's Share of Profit under Mining Lease	13,989
Dividends No. 87 of 4½d. per share and No. 88 of 6d. per share	201,250
Directors' Special Remuneration	7,500
Appropriation for capital expenditure	8,600
Balance unappropriated at 31st December, 1956	363,893
	£604,819

ORE RESERVE (based on pay limit of **3.8** dwt.) (1955—**3.8** dwt.) :

As at end of	Tons	Stope Width (inches)	Stope Value (dwt.)	Inch-dwt.
1955	2,776,700	46.21	4.79	221
1956	2,524,400	47.79	4.97	238

The reserve includes ore developed on the Footwall Reef, which totalled **623,840** tons averaging **5.47** dwt. over a stope width of **72.00** inches. The value of the ore mined from the reserve in **1956** was **4.68** dwt. per ton, being **0.11** dwt. below the average value of the reserve at the beginning of the year.

DEVELOPMENT :—

Footage Advanced	Footage Sampled	Percentage Payable	Average reef width (inches)	Average assay value (dwt.)	Inch-dwt.
54,838	45,050	27.2	59.30	11.31	671

Development footage on the Footwall Reef horizon was further increased and as a result the ore reserves on this horizon were increased. The results obtained from Footwall Reef development, which are included in the totals, are as follows :—

29,772	24,000	25.3	95.46	9.32	890

EXTRACT FROM CHAIRMAN'S REVIEW—The working profit for the year was **£8,095** less than in 1955. This was due to a drop of .02 dwt. per ton in the yield.

Working costs per ton were slightly lower than 1955, mainly due to lower development costs resulting from the decrease in the footage advanced.

The company is adversely affected by the Pneumoconiosis Act, 1956, which came into force on the 1st August, 1956. Its share of the annual levy amounted to **£84,033** during 1956 compared with **£67,381** for the previous year, and a further increase in the company's contributions must be expected during the current year.

The amount of new development is likely to continue to diminish from now on as more of the remaining unstoped sections of the mine become fully developed. Development work is being concentrated to a greater extent on the Footwall Reef, which is expected to contribute to the ore reserves in increasing proportions. While the total ore reserves at the end of the year were lower than at the end of 1955, the tonnage included from the Footwall Reef, was **623,840** tons, averaging **5.47** dwt. compared with the 1955 figure of **439,040** tons averaging **6.37** dwt.

It is estimated that approximately **£100,000** will be spent on capital account during the current financial year. The major portion of this expenditure will be incurred in the provision of equipment for the reclamation of certain surface dumps and the restoration of the sands and flotation section of the reduction plant for the handling and treatment of tonnage supplementary to that derived from underground operations. Net cash assets are sufficient to cover this capital expenditure. This scheme for the reclamation of surface dumps is intended to facilitate the maintenance of the supply of ore to the mill, which has become increasingly difficult lately.

NOTE : All development values represent the actual results of sampling, no allowance having been made for adjustments which are necessary in estimating ore reserves.

The full reports and accounts can be obtained from the London Secretaries of the companies, Anglo American Corporation of South Africa, Limited, 40 Holborn Viaduct, London, E.C.1.

COMING EVENTS IN THE MINING INDUSTRY

A general meeting of the North Staffordshire Institute of Mining Engineers will be held at the North Staffordshire Technical College, Stoke-on-Trent, on April 15, 1957.

★

The U.S. Lead Industries' Association will hold its 1957 annual meeting in Chicago, on April 24 and 25, 1957.

★

The Second Annual Symposium on Rock Mechanics, sponsored by the Colorado School of Mines, will be held at Golden, Colorado, from April 21 to 24, 1957.

★

Materials attractive for use at 1,500 deg. F. in aircraft, missiles and nuclear reactors will be discussed at a two-day conference to be held in Cleveland on April 16-17 under the sponsorship of the Cleveland Section of the American Institute of Mining, Metallurgical and Petroleum Engineers. The programme has been arranged with the co-operation of the Institute's High Temperature Materials Committee.

★

The tenth annual conference of Incorporated Plant Engineers will be held at the Palace Hotel, Buxton, on May 15-17, 1957.

★

An International Mineral Dressing Congress is to be held in Stockholm from September 18 to 21, 1957.

ANGLO-FRENCH EXPLORATION

DIVIDEND INCREASED

The Sixty-seventh Annual General Meeting of The Anglo-French Exploration Company, Ltd., was held on April 3 in London.

The Chairman, **Mr. F. R. Cottell, A.C.A.,** in the course of his speech, said: Our investments stand in the books at £1,152,528 and are valued at £1,546,182, an excess of £393,654, which I think you will agree can be considered to be satisfctory.

The classification of our investments based on the valuation at December 31, 1956, is:—

Gold Mining (including holding companies which have substantial interests in gold mining companies)	49.2%
Oil	20.2%
Copper, lead, zinc	13.3%
Coal	7.9%
Tin	4.8%
Platinum	3.3%
Miscellaneous	1.3%

Our gold mining interests are mainly located in the Far West Rand and in the Orange Free State in the Union of South Africa. The dividend paying stage has now been reached by most of the mines in these areas but future dividends should increase with the further expansion of the scale of operations.

In the profit and loss account it is gratifying to report an increase of £23,000 in our receipts from dividends and interest on investments; this reflects the improvement in the dividends being paid by the developing mines in South Africa to which I have already referred. Profit realized by sales and sundry credits is reduced by £14,000; this is necessarily a fluctuating amount from year to year and the market for gold shares in the year under review was unfavourable.

Total revenue amounts to £146,208 against £137,277. Taxation is up from £59,056 to £67,497 and after applying £8,363 in reduction of book value of investments the profit for the year is £49,324 against £45,509 in 1955. The dividend which we recommend of 1/10½d per £1 unit of stock will require £48,516.

None of the properties which were offered to the Company in the course of the year was sufficiently attractive to interest the Company.

The increasing use of gold as a medium of international settlements and the larger volume of international trade accompanied by price increases accentuated by continuing world inflation, lend support to the view that present gold reserves are quite inadequate. If that view is correct, an adjustment in the world price of gold will be a necessity.

It is to be hoped that in the forthcoming United Kingdom budget steps will at last be taken to implement the recommendation of the Royal Commission on the Taxation of Profits and Income that companies within a certain category described as "overseas trade corporations" should be liable to United Kingdom tax on distributed profits only. Legislation to effect such a change in our tax structure is urgently required in order that companies within that category, such as mining companies operating abroad, may be put in a position to compete with foreign owned companies which at present operate under much more favourable tax provisions.

The report and accounts were adopted.

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NATIONAL COAL BOARD

DURHAM DIVISION

DEPUTY AREA PRODUCTION MANAGER (PLANNING)

Applications are invited for the above post in No. 6 (North West Durham) Area with Headquarters at Shotley Bridge, Co. Durham.

Salary Range £2,000—£2,850 p.a.

Applicants must possess a First Class Certificate of Competency and have held senior managerial posts. They should have had experience in planning and in supervision of reconstruction work above and below ground, and experience in the latest methods of mining, including face mechanisation and modern transport layout. The successful applicant will be in charge of the Area Planning Department and will be responsible for the co-ordination of all the planning work in the Area. Please quote reference E.V.201/66.

APPLICATIONS giving details of age, education qualifications and experience should be submitted within seven days of publication to:—Divisional Chief Staff Officer, National Coal Board, Durham Division, 7 Side. Newcastle-on-Tyne, 1.

NATIONAL COAL BOARD

DURHAM DIVISION

METHOD STUDY ENGINEERS

Applications are invited for the following appointments in each of the Production Departments of Areas Nos. 1 to 5, which have their headquarters respectively at South Shields, Sunderland, Castle Eden, Bishop Auckland and Stanley, Co. Durham.

(a) Method Study Engineer Grade 1: Salary Range £1,000—£1,400. The duties of the post include acting as leader of a team responsible under the Area Method Study Engineer for the application of method study at collieries and ancillary works in the Area.

(b) Method Study Engineer Grade 2: Salary Range £800—£1,100. The duties of the post include acting as a member of a team under the supervision of a Team Leader for the application of method study at collieries and ancillary works in the Area.

Applicants for both these appointments should preferably have a Mining, Mechanical or Electrical Engineering qualification. Recent experience or training in method study would be an advantage but training will be given to suitable candidates where necessary.

(c) Method Study Engineer Grade 3:
Salary Range £560 (At age 23)
£580 (At age 24)
£600 (At age 25)
to maximum of £900.
There will be two appointments in each Area and the successful applicants will be required to form the junior members of a method study team and to train in this technique in its application to collieries and ancillary works. Experience of collieries or engineering works and a good general education is desirable.

(Salaries on appointment will be according to qualifications and experience within the salary ranges quoted).

CANDIDATES for more than one vacancy should submit separate applications for each post or grade of post for which they wish to be considered. The order of preference of Areas should be stated in each application.

APPLICATIONS, quoting reference EV.198/66 and giving full details of age, education and experience, should be submitted within seven days of publication to:—Divisional Chief Staff Officer, National Coal Board, Durham Division, Staff Department, 7 Side, Newcastle upon Tyne, 1.